505-41-18

Interface Requirements Document between the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) and MITI ASTER GDS Project

October 1997

UNOFFICIAL

Revision A

National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

Interface Requirements Document
between Earth Observing System Data and Information System (EOSDIS) Core System (ECS) and MITI ASTER GDS Project

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Change Information Page

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Baseline	07/13/95	All	CCR 505-41-18-001
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CH02	10/22/96	iii, v, 4-21, 4-22, 5-9	CCR 505-41-18-003
CH03*	12/22/96	iii, v, 1-2*	CCR 505-41-18-005-B
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Preface

This document is a formal contract deliverable with an approval code 1. It requires Government review and approval prior to acceptance and use. Changes to this document also require Government approval prior to acceptance and use. Changes to this document shall be made by document change notice (DCN) or by complete revision.

This document is under ESDIS Project Configuration Control. Any questions or proposed changes should be addressed to:

Configuration Management Office
Goddard Space Flight Center

Code 423

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Abstract

The Earth Observing System Data and Information System (EOSDIS) Core System (ECS) involves the collection and distribution of data from space and ground based measurement systems to provide the scientific basis for understanding global change. Using ECS as their window to the EOSDIS, the international science community is able to access data from a distributed archive in the United States and from other international Earth Science support systems. To accomplish this mission, it is necessary for ECS to interface to a wide variety of external systems. This document represents the requirements to provide an interface between ECS and the Japan Ministry of International Trade and Industry (MITI) Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Ground Data System (GDS) Project.

The ECS contractor team used the process described in the ECS Methodology for Definition of External Interfaces document to develop these interface requirements. Memoranda of Understanding (MOUs), Project Implementation Plans (PIPs), the Earth Science Data and Information System (ESDIS) Project—Level 2 Requirements, and the Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (the ECS Level 3 requirements document) were used in the methodology to evolve this formal Interface Requirement Document (IRD).

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1. Introduction

1.1 Identification

This Interface Requirement Document (IRD), Contract Data Requirement List (CDRL) item 039, whose requirements are specified in Data Item Description (DID) 219/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000). It defines the interface requirements between ECS and Japan's Ministry of International Trade and Industry (MITI) Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Ground Data System (GDS) Project.

1.2 Scope

ASTER is a facility instrument provided by MITI under an agreement with NASA. MITI has assigned responsibility for the design, development, procurement, testing, and operating of the ASTER GDS to Earth Remote Sensing Data Analysis Center (ERSDAC). Japan Resources Observation System Organization (JAROS) has been assigned responsibility for the design, development, procurement, testing, and delivery of the ASTER instrument.

This IRD defines all of the system data interfaces that exist between ECS and the ASTER GDS. Other documents also exist that pertain to EOSDIS/ASTER GDS interfaces (such as implementation schedules, and operations and testing interfaces). These documents are listed in Section 2 - Related Documentation. In the future, ECS also plans to deliver the ECS Security Plan (DID 214/SE1). Portions of this document will address security aspects related to ECS external interfaces.

1.3 Purpose and Objectives

This document is written to formalize the ECS interpretation and general understanding of the interface between ECS and the ASTER GDS. For ECS, this document provides a clarification and elaboration of the ECS/ASTER GDS interface requirements from the Functional and Performance Requirements for the EOSDIS Core System. It is meant to stand alone as a total document and contains more detail than a Level 3 requirements specification.

The objective of this document is to provide a focus for defining related Interface Control Document(s) (ICDs) which are jointly developed by ESDIS and ERSDAC to cover each major subsystem interface identified in this IRD.

The ESDIS Project has joint responsibility with ERSDAC for the development and maintenance of this IRD. Any changes in the interface requirements must be agreed by the relevant participating parties, and then assessed at the ESDIS Project level. This IRD will be approved under the signature of the ESDIS Project Manager and the ERSDAC ASTER Ground Data System Manager.

1.4 Status and Schedule

This document will be submitted to the ECS Contractor CCB as a final IRD. As a formal contract deliverable with approval Code 1, this document requires Government review and approval prior to acceptance and use. This document will be under full Government CCB control.

Changes may be submitted for consideration by Contractor and Government Configuration Control Boards (CCBs) under the normal change process at any time.

1.5 Document Organization

This Interface Requirements Document is organized as described below

Section 1	Introduction - Introduces the IRD's scope, purpose, objectives, status, schedule, and document organization.
Section 2	Related Documentation - Provides a bibliography of reference documents for the IRD organized by parent, applicable, and information subsections.
Section 3	Systems Description - Provides an overview of both systems and a discussion of the system components involved in the interface. A context diagram depicting the functional interfaces is also included.
Section 4	Data Flow Descriptions- Provides a discussion of how the interface is used from an operational point of view. A table is also provided to summarize the data flow interfaces.
Section 5	Functional and Performance Interface Requirements - Requirements are sorted for presentation by denoting functional or performance type. Traceability to parent documents is also noted in this section.
Section 6	Interface Control Documentation Plan - Identifies and summarizes the ICD(s) that will be spawned from this IRD.

1.6 Document Change Procedure

Change to the terms and conditions of this document can be initiated by either party and changed only by mutual agreement of both parties. Proposed changes to this document must be approved by both the NASA ESDIS Project and ERSDAC ASTER Project CCBs. The EOS Project CCB responsibility for this document is established in accordance with the requirements of the Earth Observing System Configuration Management Plan, 420-02-02. The ASTER Project CCB responsibility for this document is established in accordance with the requirements of the document, ERSDAC AG-E-S-0004.

2. Related Documentation

2.1 Parent Documents

The following documents are the parents from which this document's scope and content derive:

	Memorandum of Understanding Between the United States National Aeronautics And Space Administration and the Ministry of International Trade and Industry of Japan concerning Cooperation in the Flight of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) on the NASA Polar Orbiting Platform and Related Support for an International Earth Observing System, (current version) (under development)
	Project Implementation Plan, Volume II - Ground Data System, Advanced Spaceborne Thermal Emission and Reflection Radiometer and ESDIS and EOS-AM Projects, (current version) (under development)
GSFC 423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System, June 1994
GSFC 423-10-01-1	Goddard Space Flight Center, Earth Science Data and Information System (ESDIS) Project -- Level 2 Requirements, May 21, 1993
GSFC 423-41-01	Goddard Space Flight Center, EOSDIS Core System Statement of Work, May 21, 1993
301-CD-002-003	EOSDIS Core System Project, System Implementation Plan for the ECS Project
193-208-SE1-001	EOSDIS Core System Project, Methodology for Definition of External Interfaces
GSFC 170-01-01	Execution Phase Project Plan for Earth Observing System (EOS), May 1995, Revision A.

2.2 Applicable Documents

The following documents are referenced herein and are directly applicable to this document. In the event of conflict between any of these documents and this document, this document shall take precedence.

GSFC 505-41-12	EOSDIS Core System Project, Interface Requirements Document Between EOSDIS Core System (ECS) and Science Computing Facilities
540-022	EOSDIS Backbone Network (EBnet IRD), July 1996
GSFC 423-16-01	EOSDIS Core System Project, Data Production Software and Science Computing Facility (SCF) Standards and Guidelines, January 14, 1994
GSFC 423-35-01	Goddard Space Flight Center, EOS Data and Operations System (EDOS) and EOS Communications (ECOM) Requirements, CH-19, March 1992
GSFC-423-16-02	EOSDIS Core System Project, PGS Toolkit Requirements Specification for the ECS Project, Final, October 1993
101-CD-001-003	EOSDIS Core System Project, Project Management Plan for the EOSDIS Core System
194-102-MG1-001	EOSDIS Core System Project, Configuration Management Plan for the ECS Project
194-809-SD4-001	EOSDIS Core System Project, PGS Toolkit Users Guide for the ECS Project, Version 1, Final
205-CD-001-002	EOSDIS Core System Project, Science Users Guide and Operations Procedure Handbook for the ECS Project
308-CD-001-003	EOSDIS Core System Project, Software Development Plan for ECS
194-202-SE1-001	EOSDIS Core System Project, Standards and Procedures for the ECS Project
194-106-MG1-001	EOSDIS Core System Project, Schedule Management Plan for the ECS Project
107-CD-002-XXX	EOSDIS Core System Project, Level 1 Master Schedule for the ECS Project
194-501-PA1-001	EOSDIS Core System Project, Performance Assurance Implementation Plan (PAIP) for the ECS Project
101-001-CO2-001	EOSDIS Core System Project, Unclassified Automated Information Resources Security Plan for the ECS Project
307-CD-001-002 & 329-CD-001-002	EOSDIS Core System Project, Flight Operations Segment (FOS) Release Plan and Development Plan for the ECS Project
307-CD-002-002 & 329-CD-002-002	EOSDIS Core System Project, Science Data Processing Segment (SDPS) Release Plan and Development Plan for the ECS Project

307-CD-003-003 & 329-CD-003-003	EOSDIS Core System Project, Communications and System Management Segment (CSMS) Release Plan and Development Plan for the ECS Project

2.3 Information Documents

The following documents, although not directly applicable, amplify or clarify the information presented in this document, but are not binding.

	Martin Marietta Corporation, ASTER Instrument Flight Operations Understanding (Preliminary), August 1993
	Goddard Space Flight Center, Earth Observing System Mission Operations Concept Document, March 1993
604-CD-001-004	EOSDIS Core System Project, Operations Concept for the ECS Project: Part 1 -- ECS Overview.
604-CD-002-002	EOSDIS Core System Project, Operations Concept for the ECS Project: Part 2B -- ECS Release B.
604-CD-004-001	EOSDIS Core System Project, Operations Concept for the ECS Project: Part 2 -- FOS
GSFC 505-41-15	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS and the AM Project for AM-1 Flight Operations
540-028	EOS Data and Information System (EOSDIS) Backbone Network (EBnet) Operations Concept Document, May 1996, Revision 1
560-EDOS-0106.0002	Goddard Space Flight Center/MO&DSD, Earth Observing System (EOS) Data and Operations System (EDOS) Operations Concept, December 1992
560-EDOS-0211.0001	Goddard Space Flight Center/MO&DSD, Interface Requirements Document Between EDOS and the EOS Ground System (EGS) Elements, Preliminary, August, 1994

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3. Systems Descriptions

3.1 Systems Relationship Overview

The ECS and the ASTER GDS will work together to provide ground support for mission operations and science data processing for the ASTER instrument onboard the EOS AM-1 spacecraft. This support includes spacecraft and instrument mission operations (planning, scheduling, control, monitoring, and analysis), science data processing (data processing, distribution, and archival), and ground system communications and management. In addition, the ASTER GDS will be interoperable with ECS so that an EOSDIS user or ASTER GDS user will be able to view the data holdings and order production data from the other system. Sections 3.2 and 3.3 provide overall views of the ECS and the ASTER GDS Project to form a basis for understanding the interface requirements between them. Figure 3-1 presents a context diagram for the ECS/ASTER GDS interface. Note that the user interfaces for Data Search & Request and Data Product delivery in this diagram depict only the interfaces related to ECS/ASTER GDS data interoperability.

3.2 EOSDIS Core System (ECS)

3.2.1 ECS Overview

The ECS is a component of the EOSDIS. ECS supports the planning, scheduling, and control of U.S. EOS spacecraft and instruments. In addition to fully supporting the EOS series, the ECS provides information management and data archive and distribution functions for other NASA Earth science flight missions, NASA instruments flown on non-NASA spacecraft, and for other NASA held Earth science data.

3.2.2 ECS Segments

ECS is composed of three segments defined to support three major operational areas: flight operations, science data processing, and communications/system management. The ECS segments are described below:

a. The Flight Operations Segment (FOS) manages and controls the U.S. EOS spacecraft and instruments. The FOS includes the EOS Operations Center (EOC), which is responsible for mission planning, scheduling, control, monitoring, and analysis in support of mission operations for U.S. EOS spacecraft and instruments other than ASTER. Communications for EOS spacecraft and instrument commands will go through the EOC, which coordinates with external systems such as the ASTER Instrument Control Center (ICC). The EOC also will monitor the ASTER instrument in support of the ASTER ICC. The EOC is located at the Goddard Space Flight Center (GSFC).

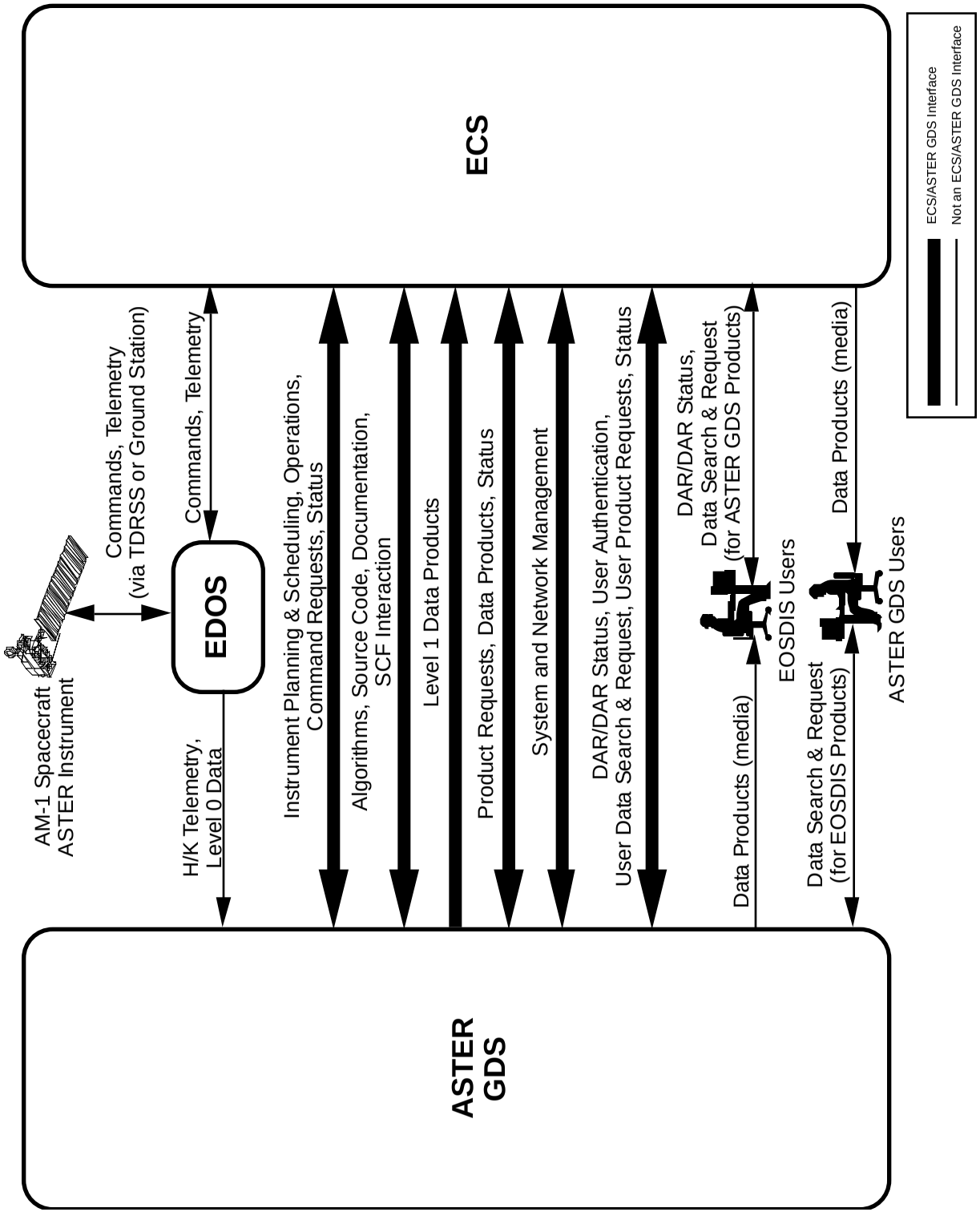

Figure 3-1. ECS/ASTER GDS Context Diagram

b. The Science Data Processing Segment (SDPS) provides a set of ingest, processing, and distribution functions for science data and a data information system for the entire EOSDIS. The SDPS processes data from the EOS instruments to Level 1-4 data products. The SDPS also provides short- and long-term storage for EOS, other Earth observing missions, and other related data, software, and results, and distributes the data to EOSDIS users. The SDPS contains a distributed data and information management function and user services suite for the ECS, including a catalog system in support of user data selection and ordering. The SDPS also performs the functions required for constructing EOSDIS User Data Acquisition Requests (DARs) for the ASTER instrument. The SDPS provides the ASTER DARs to the ASTER GDS for further processing, obtains EOSDIS ASTER DAR status and schedule from the ASTER GDS, and forwards this information to EOSDIS users. SDPS elements that support the ECS/ASTER GDS interface are primarily located at the Earth Resources Observation System (EROS) Data Center (EDC) DAAC in Sioux Falls, South Dakota.

c. The Communications and System Management Segment (CSMS) provides overall ECS management of ECS ground system resources and manages the ECS interfaces to external networks. The CSMS also includes Local Area Networks (LANs) at each of the DAACs and the EOC to support ECS operations; and interfaces at DAACs with the EOSDIS Backbone Network, NOLAN, and NSI. The CSMS System Monitoring and Control (SMC), along with local system management capabilities at DAAC sites and the EOC, provides system management services for ECS ground system resources. Most of the operations staff is considered part of the SDPS or FOS, including Local System Management (LSM) operators.

3.3 MITI ASTER Project

3.3.1 ASTER GDS Overview

The ASTER GDS has been defined as a hierarchy of segments, subsystems, and components. Three ASTER GDS segments are defined to support three major operational areas: the ASTER Operation Segment (AOS), the Communications and System Management Segment (CSMS), and the Science Data Processing Segment (SDPS). The segments are further divided into ASTER GDS functional elements to provide the support required by the operational segments. The major elements of the ASTER GDS are described briefly below.

3.3.1.1 ASTER Operations Segment

The AOS manages the ASTER instrument operations and controls the ASTER instrument through the EOC. The AOS elements are the Instrument Control Center (ICC), including the Instrument Control Operation Subsystem, the Instrument Analysis Support Subsystem, and the Instrument Support Terminal (IST). The ICC is responsible for the operations of the ASTER instrument. It performs planning, scheduling, commanding (via EOSDIS), and monitoring. The IST is defined as a facility that connects the ASTER Science Team Leader to the ICC in support of instrument operation.

3.3.1.2 ASTER Communications and System Management Segment

The ASTER CSMS provides system resource management, communications services, and a data information system for the entire ASTER project. The CSMS includes the Ground System Management Subsystem (GSMS), and the ASTER Data Network (ADN). The GSMS provides system management services for the ASTER GDS elements, plus coordination of ground system operations within and between these elements. The ADN provides an internal network for communications among the ASTER GDS elements, a network interface to the science user network, network services at the application layer <TBR>, and a network management facility.

3.3.1.3 ASTER Science Data Processing Segment

The ASTER SDPS provides a set of processing and distribution elements for ASTER science data, and a software implementation system for the entire ASTER Product Generation Subsystem (PGS). The ASTER SDPS elements include the PGS, consisting of the Data Processing Subsystem (DPS), the Data Analysis Subsystem (DAS) the Information Management Subsystem (IMS), the ASTER Data Archive and Distribution Subsystem (DADS), and the Software Implementation Support Subsystem (SISS). The PGS and DADS facilities process the data from Level 0 data up to standard higher data products, provide short- and long-term storage for the ASTER project, and distribute the data to users. The IMS provides a data and information management service including a catalog system in support of user data selection and ordering.

3.3.1.4 ASTER Direct Downlink Receiving Station

TBS.

3.3.2 ASTER Instrument Description

The ASTER instrument will provide high-resolution images of the land surface and clouds for climatological, hydrological, biological, and geological studies. The ASTER instrument has three major, independently commandable subsystems: visible and near infrared (VNIR), short-wave infrared (SWIR), and thermal infrared (TIR). VNIR, SWIR and TIR will have the capability to image the same 60 km imaging swath with pointing capability in the cross-track direction within the range of 272 km. The three radiometers are used together to acquire dayside images for pre-planned targets during the observation period for up to 16 minutes. TIR and SWIR are used for imaging nightside targets for up to 2 minutes of observation each.

VNIR provides images in three visible and near-infrared bands—centered at 0.56, 0.66, and 0.81 micrometers (μm)—with a spatial resolution of 15 meters (m). VNIR has two telescopes: a nadir-looking telescope operating in all three bands, and a backward-looking telescope operating in the 0.81 μm band only. VNIR can be pointed across track at any angle up to 24 degrees.

SWIR provides images in six short-wave infrared bands between 1.65 and 2.40 μm with a spatial resolution of 30 m. SWIR can be pointed across the track at any angle up to 8.55 degrees in either direction.

TIR provides images in five thermal infrared bands between 8.30 and 11.30 μm with a spatial resolution of 90 m. TIR can be pointed across the track at any angle up to 8.55 degrees in either direction by rotating its scan mirror.

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4. Data Flow Descriptions

4.1 Overview

The ECS/ASTER GDS interfaces are summarized in Table 4-1. Throughout this section, the data flows are identified by the numbers used in this table. These data flow numbers are enclosed in brackets after the first reference to the data flow. Issues associated with an interface also are identified in brackets, and are described in more detail in Appendix B.

The data flow descriptions are organized into eight categories and are discussed in Sections 4.2 through 4.9. These categories include Pre-Mission Interfaces; DAR Handling; Planning and Scheduling/Command Load Generation; Instrument Operations; Science Data Handling; User Search and Request Interface; Product Request and Delivery; and Network Management.

The data flow concepts discussed in the following paragraphs represent the current ECS understanding of the ECS/ASTER GDS interface. The data flow descriptions provided in this section are based on the assumption that the functionality of the ASTER GDS segments (AOS, SDPS, and CSMS) will be similar to that of their ECS counterparts (FOS, SDPS, and CSMS).

ECS/ASTER GDS interfaces for international data exchange will be accomplished via electronic networks and postal delivery. There will be three levels of electronic communications support between EOSDIS elements and the ASTER GDS: Mission Critical, Production Support, and Science Access. These levels-of-service are described as follows:

1. Mission Critical

   This category primarily includes flows that are critical to spacecraft and instrument health and safety. These flows have the highest availability and security requirements. Availability of .9998 is required, with MTTRS of 1 minute. Authentication and integrity are required for instrument commands.

2. Production Support

   Flows in this category are intended to support data exchanged primarily in support of data production. The availability and security requirements are therefore significantly lower than that of mission critical data flows. Availability of .98 is required, with MTTRS of 4 hours.

   In addition, Mission Operations flows which can tolerate the long Mean Time to Restore to Service (MTTRS) expected in this class of service are also included in this category.

3. Science Access

   Science Access flows are for users accessing science data. Accordingly, the availability and security requirements are lowest for this class -- no specific availability or MTTRS

are specified, and any security requirements are implemented by end system, not the networks.

Table 4-1. ECS/ASTER GDS Data Flows (1 of 6)

From	To	Data Flow	Description	Level of Service
ASTER GDS	ECS (EDC DAAC)	[1] ECS-SCF Interaction	Includes data flows associated with data production software development and calibration coefficient updates. Refer to the IRD Between ECS and SCFs for identification and description of flows.	Science Access
ECS (EDC DAAC)	ASTER GDS	[2] ECS-SCF Interaction	Includes data flows associated with data production software development and calibration coefficient updates. Refer to the IRD Between ECS and SCFs for identification and description of flows.	Science Access
ASTER GDS	ECS (EDC DAAC)	[3] Algorithms, Source Code, Documentation	-Level 1 -Standard products: on request (algorithm, source code, and documentation) -Special products: on request (only algorithm)	Science Access Tape (postal delivery)
ECS (EDC DAAC)	ASTER GDS	[4] Algorithms, Source Code, Documentation	-Standard products: on request (algorithm, source code, and documentation) -Special products: on request (only algorithm)	Science Access Tape (postal delivery)
ECS	ASTER GDS	[5] Long Term Science Plan	Long Term Science Plan provided to ECS by the Senior Project Scientist and IWG.	Science Access
ECS	ASTER GDS	[6] Long Term Instrument Plans	Long Term Instrument Plans which are developed by the Instrument Teams, provided to ECS by the Senior Project Scientist and the IWG, and available to all PIs/TLs.	Science Access
ECS	ASTER GDS	[7] EOC Operations Data Base	Includes spacecraft (including ASTER) telemetry formats, ASTER command formats, procedures, limits, constraints, activity definitions, and associated information including housekeeping data conversion tables.	Mission Critical

Table 4-1. ECS/ASTER GDS Data Flows (2 of 6)

From	To	Data Flow	Description	Level of Service
ASTER GDS	ECS	[8] ASTER Operations Data Base	Includes ASTER telemetry formats, ASTER command formats, procedures, limits, constraints, activity definitions, and associated information including housekeeping data conversion tables.	Mission Critical
ASTER GDS	ECS	[9] Instrument Information/ Constraints	Information about the operational constraints of the ASTER instrument. Used by the ECS SDPS DAR development software to constraint-check user DAR inputs.	Production Support
ECS	ASTER GDS	[10] ASTER DARs	Data Acquisition Requests for the ASTER instrument.	Production Support
ECS	ASTER GDS	[11] DAR Status Request	Query for status of an ASTER DAR.	Production Support
ASTER GDS	ECS	[12] DAR Status	Status of ASTER DARs.	Production Support
ASTER GDS	ECS	[13] Planning & Scheduling Requests	Requests for ASTER instrument activities and updates. Includes ASTER Instrument Resource Profiles, Instrument Resource Deviation Lists, Instrument Activity Lists, Instrument Activity Deviation Lists, and “What-If” Queries (“What-If” Queries are coordinated with the EOC prior to submission.)	Mission Critical
ECS	ASTER GDS	[14] Integrated Plans & Schedules	AM-1 plans and schedules which include schedules for activities for the AM-1 spacecraft and all instruments. Includes the Preliminary Resource Schedules, Detailed Activity Schedules, Planning & Scheduling Request Rejections, and “What-If” Results.	Mission Critical
ECS	ASTER GDS	[15] Planning Aids	Planning and scheduling aids (includes predicted orbit, etc.).	Mission Critical
ASTER GDS	ECS	[16] Inter-Instrument Coordination	Text message exchange to coordinate instrument planning and operations.	Production Support
ECS	ASTER GDS	[17] Inter-Instrument Coordination	Text message exchange to coordinate instrument planning and operations.	Production Support

Table 4-1. ECS/ASTER GDS Data Flows (3 of 6)

From	To	Data Flow	Description	Level of Service
ECS	ASTER GDS	[18] Command Load Generation Status	Notification of problems or conflicts associated with generation of the integrated command load, or command load report resulting from successful load generation. The command load report contains Absolute Time Command (ATC) load contents.	Mission Critical
ECS	ASTER GDS	[19] Instrument Command Uplink Status	Status that indicates the following information: command receipt at EOC, command validation by EOC, and command receipt by AM-1 (CLCW, successful command load, command counter increment, etc.).	Mission Critical
ASTER GDS	ECS	[20] Real time command requests	Command request including mnemonics or groups of mnemonics for ASTER instrument commanding that are received and uplinked by the EOC (under FOT control) while in real time (communications) contact with AM-1.	Mission Critical
ASTER GDS	ECS	[21] Pre-planned command groups	Mnemonics or groups of mnemonics, previously defined by the ASTER instrument team and stored at the EOC. Used during pre-defined contingency situations.	Mission Critical
ECS	ASTER GDS	[22] Instrument Command Notification (Contingency)	Data that indicates the following: instrument command uplink status, and command receipt at the ASTER instrument.	Mission Critical
ECS	ASTER GDS	[23] Spacecraft Status	Information on spacecraft activities, anomalies, or status that is of interest to ASTER operations.	Production Support
ASTER GDS	ECS	[24] Instrument Status	Instrument Status information, such as instrument anomaly notifications, instrument analysis/trending results, etc.	Production Support
ECS	ASTER GDS	[25] Mission Status Reports	Reports containing spacecraft and mission status information. Includes mission plan and schedule information.	Production Support

Table 4-1. ECS/ASTER GDS Data Flows 4 of 6)

From	To	Data Flow	Description	Level of Service
ASTER GDS	ECS (EDC DAAC)	[27] Level 1 Data and Associated Info	Level 1 data with any associated ancillary data, metadata, and browse.	Production Support Tape (postal delivery)
ASTER GDS	ECS	[29] ASTER GDS Data Shipping Notice	Product delivery schedule for an ASTER product.	Production Support
ECS	ASTER GDS	[35] Dependent Valids	Information used to identify ECS data products and valid lists for variables.	Science Access
ASTER GDS	ECS	[36] Dependent Valids	Information used to identify ASTER GDS data products and valid lists for variables.	Science Access
ECS	ASTER GDS	[37] Directory Metadata	High-level information on whole EOSDIS data sets which can be searched by ASTER GDS users to determine EOSDIS data holdings.	Science Access
ASTER GDS	ECS	[38] Directory Metadata	High-level information on whole ASTER GDS data sets which can be searched by EOSDIS users to determine ASTER GDS data holdings.	Science Access
ECS	ASTER GDS	[39] Inventory Search Requests	User query of ASTER GDS inventory.	Science Access
ECS	ASTER GDS	[41] Browse Requests	User query of ASTER GDS browse data.	Science Access
ASTER GDS	ECS	[42] Inventory Search Results	ASTER GDS inventory data provided in response to user query.	Science Access
ASTER GDS	ECS	[44] Browse Results	ASTER GDS browse data provided in response to user query.	Science Access
ASTER GDS	ECS	[45] Inventory Search Requests	User query of ECS inventory.	Science Access
ASTER GDS	ECS	[46] Guide Guide Search	User access to both ECS and ASTER GDS documentation , as part of ECS guide holdings, via the internet and HTTP.	Science Access
ASTER GDS	ECS	[47] Browse Requests	User query of ECS browse data.	Science Accesss
ECS	ASTER GDS	[48] Inventory Search Results	ECS inventory data provided in response to user query.	Science Access
ECS	ASTER GDS	[50] Browse Results	ECS browse data provided in response to user query.	Science Access
ECS	ASTER GDS	[51] Product Request	Request for an ASTER GDS data product.	Science Access

Table 4-1. ECS/ASTER GDS Data Flows (5 of 6)

From	To	Data Flow	Description	Level of Service
ASTER GDS	ECS	[53] Product Delivery Status	Status of a user product request or product generation request for an ASTER product.	Science Access
ECS	ASTER GDS	[54] Product Delivery Status Request	Request for status of a previously-submitted product request or product generation request.	Science Access
ASTER GDS	ECS	[55] Product Request	Request for an ECS data product.	Science Accesss
ECS	ASTER GDS	[57] Product Delivery Status	Status of a user product request or product generation request for an ECS product.	Science Access
ASTER GDS	ECS	[58] Product Delivery Status Request	Request for status of a previously-submitted product request or product generation request.	Science Access
ASTER GDS	ECS	[59] ASTER GDS Data Products	ASTER GDS data products provided to ECS on request.	Production Support (Level 1b); Science Access (others) Tape (postal delivery)
ECS	ASTER GDS	[60] ECS Data Products	ECS Data Products provided to ASTER GDS on request.	Science Access Tape (postal delivery)
ASTER GDS	ECS	[63] ASTER GDS Network Management Information	Status, schedule, and fault isolation network management information.	Science Access
ECS	ASTER GDS	[66] ASTER GDS Network Management Information Request	Request for status, schedule, and fault isolation ASTER GDS network management information.	Science Access
ECS	ASTER GDS	[67] ECS User Authentication Request	ECS request for ASTER GDS authentication of an EOSDIS user attempting to access ASTER GDS services.	Mission Critical; Production Support; Science Access (dependent on the service requested)
ASTER GDS	ECS	[68] ECS User Authentication Information	ASTER GDS response to an ECS User Authentication Request.	Mission Critical; Production Support; Science Access (dependent on the service requested)
ASTER GDS	ECS	[69] ASTER GDS User Authentication Request	ASTER GDS request for ECS authentication of an ASTER GDS user attempting to access ECS services.	Mission Critical; Production Support; Science Access (dependent on the service requested)

Table 4-1. ECS/ASTER GDS Data Flows (6 of 6)

From	To	Data Flow	Description	Level of Service
ECS	ASTER GDS	[70] ASTER GDS User Authentication Information	ECS response to an ASTER GDS User Authentication Request.	Mission Critical; Production Support; Science Access (dependent on the service requested)
ASTER GDS	ECS	[74] ASTER GDS System Management Information	Information on ASTER GDS system activities (such as special tests, maintenance, or system faults) that may affect the ASTER GDS interface with ECS.	Science Access
ECS	ASTER GDS	[75] ECS System Management Information	Information on ECS system activities (such as special tests, maintenance, or system faults) that may affect the ECS interface with ASTER GDS.	Science Access

The communications level-of-service for each of the ECS/ASTER GDS data flows is identified in Table 4-1. Science data products (including Level 0 and Level 1 data products) exchanged between the EOSDIS and ASTER GDS will routinely be delivered on media via postal delivery (expected delivery within 7-10 days). The ECS/ASTER GDS logical communications interfaces and the associated Levels of Service are shown in Figure 4-1.

4.2 Pre-Mission Interfaces

Data flows associated with pre-mission interfaces are described below and are depicted in Figure 4-2. These interfaces are established pre-mission (i.e., before AM-1 launch) and continue through the life of the mission, as required to support software and data base maintenance activities.

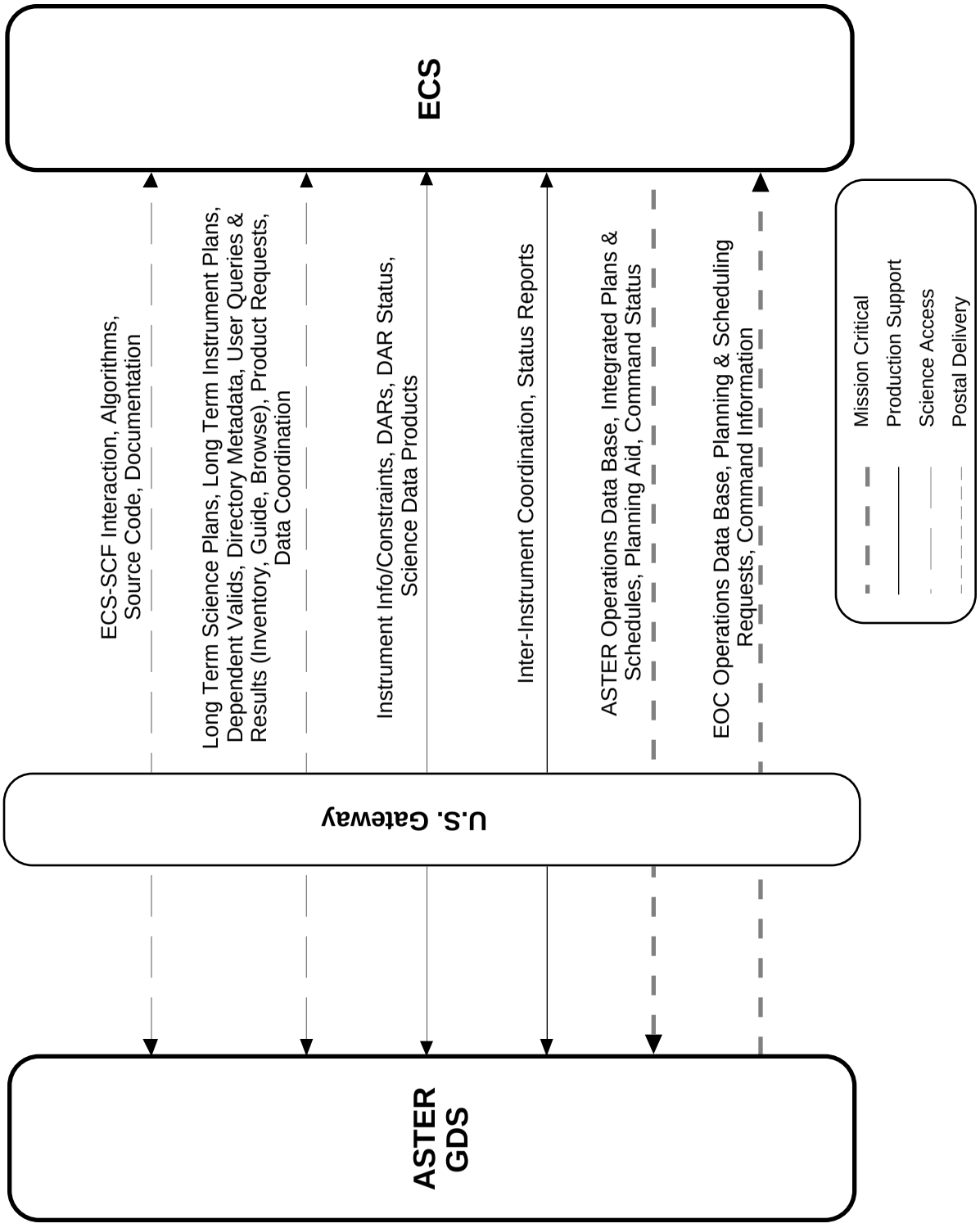

Figure 4-1. ECS/ASTER GDS Communications Levels of Service

4.2.1 Science Software Delivery

For science software development, the ASTER GDS performs functions similar to those of a Science Computing Facility (SCF). In this regard, the standard ECS/SCF interfaces, as documented in the IRD Between ECS and Science Computing Facilities will apply to the ECS/ASTER GDS interface [Table 4-1, Data Flows 1 and 2]. The ECS/SCF IRD identifies the set of data flows for SCF coordination. The data flows that apply to the ECS/ASTER GDS interface are those data flows associated with data production software delivery and calibration coefficient updates.

Science software for the generation of ASTER standard products will be developed based on algorithms developed by ASTER Science Team (AST) members in Japan and the U.S. Operationally, ASTER GDS is expected to perform standard Level 1 processing for ASTER science data. Higher level (Level 2 +) standard product generation, using science software based on U.S. AST algorithms, will be performed by ECS at EDC DAAC. In addition, higher level product generation using Japan's science software will be performed by ASTER GDS. All algorithms, source code, and documentation associated with the generation of ASTER standard products will conform to ECS standards and will reside at both ASTER GDS and ECS (at EDC DAAC) [Table 4-1, Data Flows 3 and 4]. The data exchanges associated with science software delivery will occur at a time consistent with ECS and ASTER GDS integration and test (I&T) schedules.

4.2.2 Long Term Planning

The AST will be responsible for development of the ASTER Long Term Instrument Plan (LTIP) for ASTER data acquisition. The AST presents the ASTER LTIP to the EOS Investigator Working Group (IWG), which includes all the selected interdisciplinary Principal Investigators (PIs), instrument PIs, lead U.S. co-investigators, and Facility Instrument Team Leaders (TLs). As a member of the IWG, the AST TLs also work with the EOS Senior Project Scientist to develop the EOS Long Term Science Plan (LTSP). The LTSP and LTIPs provide guidelines and policy information for mission and instrument science operations. The Senior Project Scientist provides the LTSP and associated LTIPs for the various EOS instruments to ECS for archive and distribution. Updates to the LTSP and LTIPs are handled in a similar manner. The LTSP [Table 4-1, Data Flow 5] and LTIPs [Table 4-1, Data Flow 6] will be distributed via ECS to the ASTER GDS, as required, throughout the life of the mission.

4.2.3 Operations Data Base

ASTER/EOC data base creation and distribution will be an iterative process that begins pre-mission and continues through the life of the mission. Before launch, the ASTER Instrument Project will provide an ASTER-unique operations data base to the AM-1 spacecraft manufacturer. The ASTER operations data base will contain instrument telemetry formats, command formats, procedures, limits, constraints, activity definitions, and associated information. The AM-1 spacecraft manufacturer will merge this information with the spacecraft data base and the operations data bases for the other AM-1 instruments to form the AM-1 project data base. This project data base will be provided to the EOC for testing and operations.

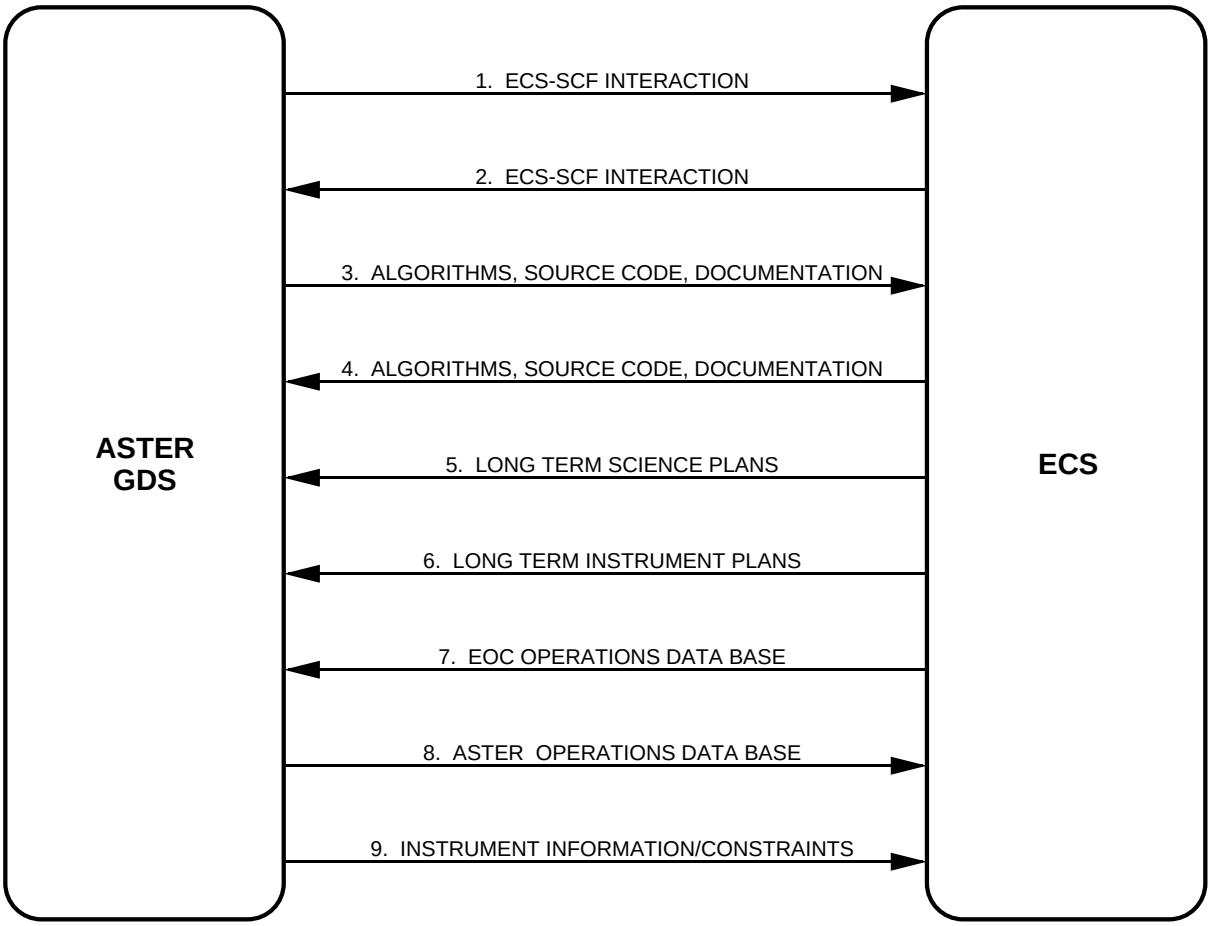

Figure 4-2. Pre-Mission Data Flows

The EOC will deliver an EOC Operations Data Base containing information relevant to ASTER operations to the ASTER ICC [Table 4-1, Data Flow 7]. This Data Base Information will contain instrument data base parameters for ASTER and spacecraft data base parameters for AM-1. The ASTER ICC uses the this information for processing ASTER and AM-1 housekeeping telemetry, and for developing ASTER instrument command groups. If the EOC changes any spacecraft values in the data base that are relevant to ASTER (such as new limits on a spacecraft parameter), the EOC will provide the ASTER ICC with the updates.

If an ASTER data base change is required after AM-1 launch, the ASTER data base administrator issues a data base change request to the EOC data base administrator. If approved, the ASTER ICC provides the updated ASTER Operations Data Base directly to the EOC [Table 4-1, Data Flow 8]. The EOC uses this data base information to develop and deliver new data bases for operations at the EOC and the ASTER ICC.

4.2.4 DAR Development Data Bases

The ECS SDPS will establish a data base of information that will be required to assist EOSDIS users in submitting ASTER DARs. The ECS SDPS will configure this DAR development data base based on the instrument information and constraints provided by the ASTER ICC prior to AM-1 launch [Table 4-1, Data Flow 9]. This includes descriptive information on the ASTER instrument, default settings for instrument configurable parameters, context and range-of-values information for instrument configurable parameters, and other instrument constraints. It is expected that this data base will be static. Infrequent minor updates may be accommodated after launch, based on new information learned about instrument operational capabilities and constraints.

4.3 DAR Handling

At launch, ASTER will have a list of planned data acquisition targets that will be agreed to by the Senior Project Scientist and the AST. Additions and changes to the ASTER target list will occur via DARs, which may be submitted by approved users. ASTER DARs also include a special subset of DARs that are termed Targets of Opportunity (TOOs). A TOO is a DAR that requires some form of special handling to schedule in a time shorter than that normally allowed.

The ECS SDPS will provide displays to guide EOSDIS users in the development of DARs for the ASTER instrument. The ECS SDPS will use an internal data base to perform high level range-of-value and reasonableness checks on DAR parameters as they are input by the user. These DAR parameters include information on the instrument configuration at the time of the data take(s), as well as specifying the desired target area for the observation(s). The user also may submit a product generation request to specify particular instructions for data processing after the data are acquired. Similarly, requests for expedited processing and product distribution requirements also may be made through the SDPS as part of the DAR process.

EOSDIS ASTER DARs that pass the SDPS validation checks will be stored in the ECS SDPS and transmitted to the ASTER IMS [Table 4-1, Data Flow 10]. If special data processing by the ASTER SDPS is requested, the associated product generation request [Table 4-1, Data Flow 52] also will be forwarded to the ASTER IMS. The product generation request will include an associated product distribution request. The ASTER IMS will store all DARs submitted for the ASTER instrument, including EOSDIS ASTER DARs that it receives by way of the ECS SDPS, as well as the Japan ASTER DARs that the Japanese users will input directly into the ASTER IMS. (Note that the ECS SDPS will only store ASTER DARs from EOSDIS users. ECS will not have access to ASTER DARs which Japanese users provide to the ASTER IMS.) The ASTER IMS will forward the ASTER DARs to the ASTER ICC for processing.

The ASTER ICC, under guidance of the AST, will accept or deny the DARs based on approved guidelines and priorities. Targets associated with accepted DARs will be added to the approved acquisition target list. The ASTER ICC will provide DAR status to users via the ASTER IMS, identifying specific DARs as accepted, scheduled, deleted, satisfied, rescheduled, etc. The latest DAR status changes will be provided to the ASTER IMS as updated information becomes available. An EOSDIS user may query the status of a specific EOSDIS ASTER DAR from the ECS SDPS at any time. The ECS SDPS, in turn, will forward a DAR Status Request [Table 4-1,

Data Flow 11] to the ASTER IMS. The ASTER IMS responds with the requested DAR Status information [Table 4-1, Data Flow 12] [Issue 9], which the ECS SDPS makes available to the user. DAR handling interfaces are depicted in Figure 4-3.

4.4 Instrument Planning and Scheduling/Command Load Generation

The following paragraphs describe the activities associated with the exchange of Planning & Scheduling Requests [Table 4-1, Data Flow 13] and Integrated Plans & Schedules [Table 4-1, Data Flow 14] between the EOC and the ASTER ICC. Planning and Scheduling/Command Load Generation interfaces also are shown in Figure 4-4. (Note that as the ECS and ASTER GDS systems are further defined, it may be determined that some of the specific planning and scheduling products discussed in the following paragraphs may not be required.)

On a routine basis, the EOC will provide the ASTER ICC with Planning Aids [Table 4-1, Data Flow 15] to assist in the generation of planning and scheduling requests. These planning aids include orbital information such as predicted ephemeris and Tracking and Data Relay Satellite System (TDRSS) view periods for the AM-1 spacecraft. ASTER requirements for planning aids are negotiated with the AM-1 Project and documented in an Operations ICD between ASTER and the AM Project.

Each week, the ASTER ICC will formulate and submit to the EOC an ASTER Instrument Resource Profile covering the planned activities for the target week occurring approximately 3-4 weeks in the future. The Instrument Resource Profile will be based upon data collection priorities defined in the ASTER LTIP, DARs, AST inputs, and instrument maintenance tasks. Updates to the Instrument Resource Profile, in the form of Instrument Resource Deviation Lists, will be accepted by the EOC up to 3 weeks prior to the target week. The Instrument Resource Profile/Instrument Resource Deviation Lists[1] will establish planned ASTER instrument activities and/or data volume needs which will be used by the EOC to negotiate TDRSS contact times. Throughout the planning and scheduling process, the ASTER ICC may exchange inter-instrument coordination information [Table 4-1, Data Flows 16 and 17] with the EOC, as necessary. This interface dialog may be used to coordinate instrument activities, such as jitter, that could involve or affect other instruments.

After negotiating the TDRSS schedule for AM-1, the EOC will provide a Preliminary Resource Schedule to the ASTER ICC. This will occur approximately 7 days prior to the start of the target week. The Preliminary Resource Schedule represents an initial integrated schedule, including TDRSS contact times, spacecraft subsystem activities, and any activities that were included in the AM-1 Instrument Resource Profiles. If the TDRSS scheduling process results in a conflict with the original ASTER Instrument Resource Profile, notification of the conflict, along with the reason, will be sent to the ASTER ICC.

[1]ASTER Short-Term Schedules (STS) shall be delivered to the EOC in “Instrument Resource Profile” or “Instrument Resource Deviation List” format.

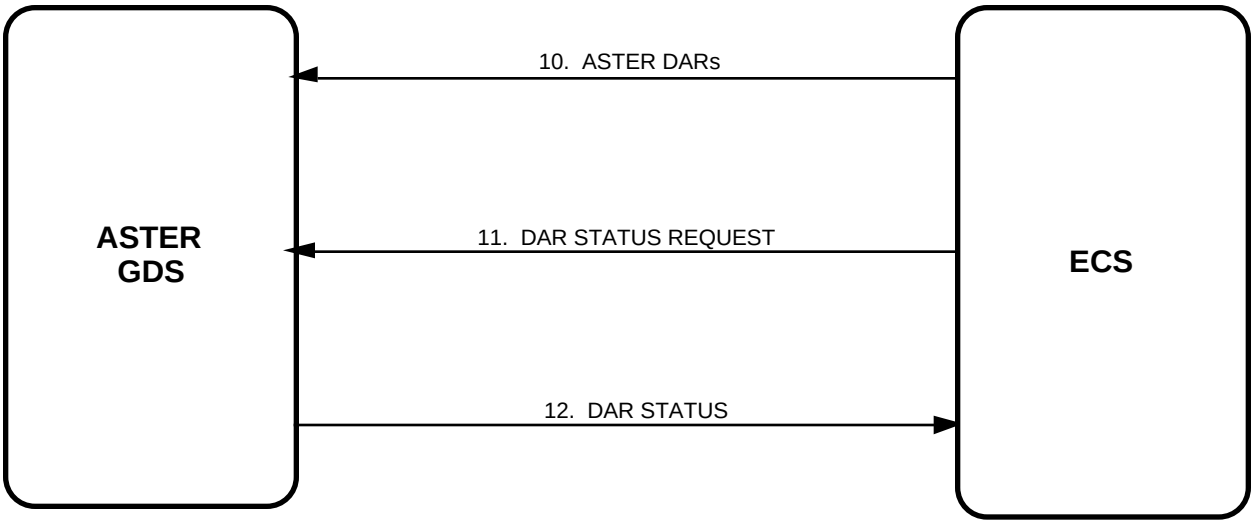

Figure 4-3. DAR Handling Data Flows

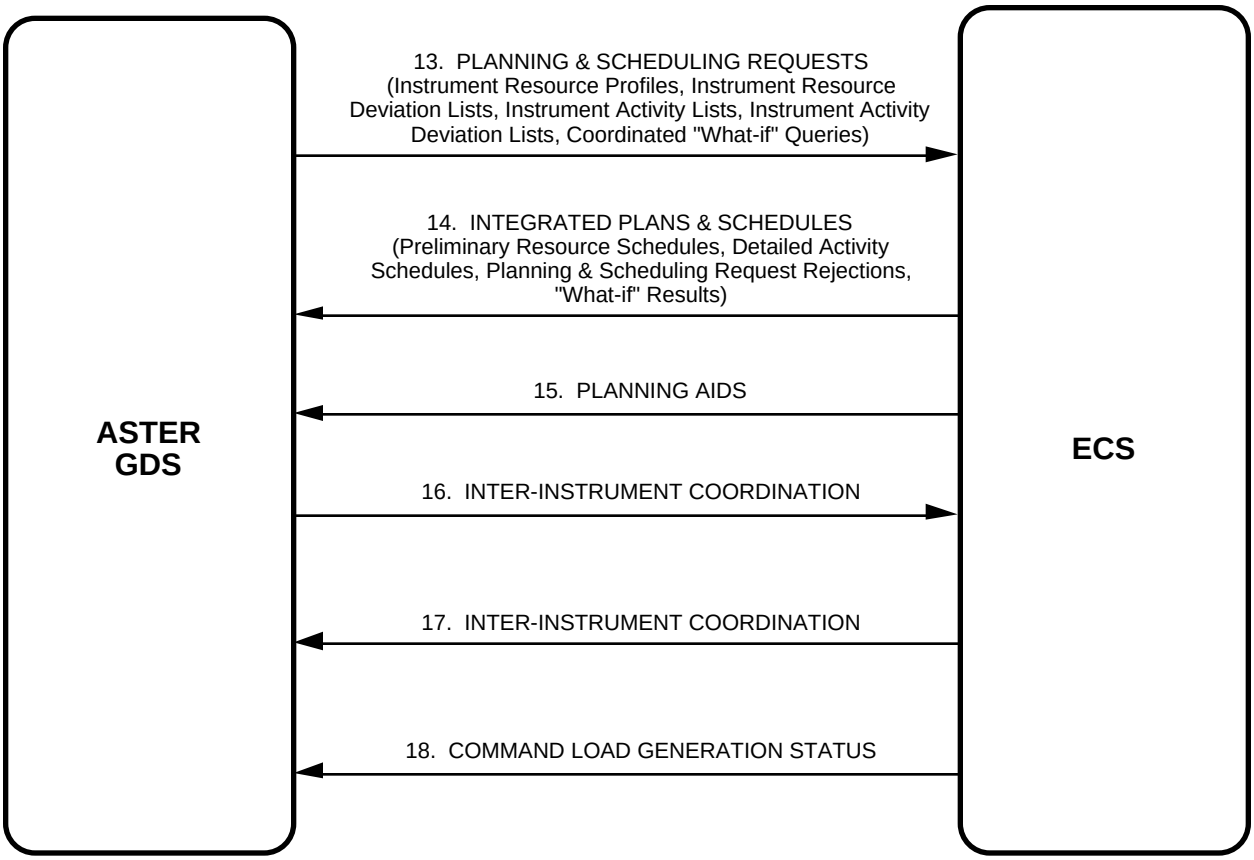

Figure 4-4. Planning and Scheduling/Command Load Generation Data Flows

Based on the weekly Preliminary Resource Schedule, the ASTER ICC will develop Instrument Activity Lists[2] covering the ASTER instrument operations for each day of the target week. Each ASTER activity consists of one or more command mnemonics. The Instrument Activity Lists also will identify such things as Direct Down Link (DDL) requests, expedited processing requirements and instrument activities associated with DARs. Each Instrument Activity List will cover a pre-defined time period and will be transmitted to the EOC in accordance with the timeline defined in the Operations ICD. Changes to the Instrument Activity List, in the form of an Instrument Activity Deviation List, also may be submitted to the EOC in accordance with the timeline defined in the Operations ICD.

On a daily basis, the EOC will integrate the ASTER Instrument Activity List with the activity lists of the other AM-1 instruments and spacecraft subsystems, creating a conflict-free 24-hour Detailed Activity Schedule. The EOC will provide the Detailed Activity Schedule to the ASTER ICC at a pre-determined time (as documented in the Operations ICD) before the start of the target day. If scheduling constraints result in conflicts with the original ASTER Instrument Activity List, notification of the impacts, along with the reasons, also will be sent to the ASTER ICC. The EOC will not unilaterally change ASTER activities. The EOC and ASTER ICC will confer to resolve conflicts identified in the scheduling process. If a conflict between AM-1 instruments cannot be resolved between the EOC and the ASTER ICC, the Senior Project Scientist (or his representative) will be contacted for further clarification. (Note that conflicts at this stage will be rare.) Conflicts which occur at this stage between ASTER activities and spacecraft activities will be resolved by the Mission Operations Manager (MOM).

To assist in conflict resolution analysis, the ASTER ICC also may submit “What-If” Activity Lists to the EOC to analyze the impact of alternative instrument activities on the integrated schedule, without actually affecting the Detailed Activity Schedule. These “What-If” Activity Lists are coordinated with the EOC prior to submission. Results of the “What-if” Activity List exercise will be forwarded to the ASTER ICC by the EOC. “What-if” Activity Lists may be coordinated with the EOC and submitted during all phases of schedule development.

The ASTER Instrument Activity List contained in the Detailed Activity Schedule will include all ASTER activities for the target day. The Instrument Activity List will be used by the EOC for generating the AM-1 integrated command load. The EOC will notify the ASTER ICC of Command Load Generation Status [Table 4-1, Data Flow 18]. This will include notification of any conflicts or problems which may arise during command load integration and validation. The status also may include a command load report, indicating the results of successful command load generation.

Occasionally, late changes will need to occur after the Detailed Activity Schedule is formed. The EOC will be able accept an approved TOO or late change, in the form of an Instrument Activity Deviation List [1a]. Concepts and time frames for TOO and late change scheduling are discussed in more detail in the ECS Operations Concept Document for the ECS Project and the Operations ICD.

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[1] ASTER One-Day Schedules (ODS) shall be delivered to the EOC in "Instrument Acitivity List" or "Instrument Activity Deviation List" format.

[1a] The Instrument Acitvity Deviation List is the same as the ASTER ODS Update.

4.5 Instrument Operations

Instrument operations data flows are shown in Figure 4-5. During normal operations, the EOC and ASTER ICC will have two real time contacts with the AM-1 spacecraft each orbit. During the real time contact, the EOC will be responsible for issuing spacecraft and instrument commands. This includes the integrated command load, which will normally be uplinked once per day. Nominally, the command load will cover the time period specified in the Operations ICD. The EOC will verify receipt of the command load by the AM-1 spacecraft.

Normally, all ASTER commanding will be handled by the integrated command load. There may be unusual circumstances, such as instrument activation or instrument contingencies, when the ASTER ICC may request the FOT to command the ASTER instrument in real time. The ASTER ICC will transmit real time command requests [Table 4-1, Data Flow 20], in the form of command mnemonics or named command procedures to the EOC. The EOC will provide to the ASTER ICC Instrument Command Uplink Status information [Table 4-1, Data Flow 19] for any ASTER real time commands uplinked by the EOC. The EOC will format and transmit validated commands to the AM-1 spacecraft via EDOS. The EOC will verify command receipt at the spacecraft for all commands (integrated load and real time commands). The ASTER ICC will verify correct command receipt and execution by the ASTER instrument for all ASTER commands (integrated load and real time commands).

During anomaly situations, the EOC Flight Operations Team (FOT) may be required to issue emergency/contingency commands for the ASTER instrument. This type of contingency commanding will normally be accomplished by the FOT issuing pre-planned commands, which the ASTER ICC has previously supplied to the EOC. Pre-planned command groups [Table 4-1, Data Flow 21] reference mnemonics or groups of mnemonics that will be stored at the EOC for use during pre-defined situations. The ASTER ICC will be informed when the EOC FOT performs ASTER emergency/contingency commanding via Instrument Command Notification messages [Table 4-1, Data Flow 22]. The Instrument Command Notification message will indicate the instrument command uplink status, and verification of command receipt at the spacecraft.

ASTER command execution will be verified at the ASTER ICC by monitoring instrument housekeeping telemetry, which the ASTER ICC receives from EDOS. The ASTER ICC will notify the EOC of any discrepancies between anticipated and observed command execution.

Both the EOC and ASTER ICC will receive and monitor critical spacecraft and instrument real time housekeeping telemetry parameters. ASTER critical parameters will be specified in the ASTER Data Base Information [Table 4-1, Data Flow 8] which will be provided to the EOC by the ASTER ICC. The EOC and the ASTER ICC will provide each other with Spacecraft Status [Table 4-1, Data Flow 23] or Instrument Status [Table 4-1, Data Flow 24] information upon detection of any unusual or anomalous conditions which may affect spacecraft or instrument operations. After each contact, the ASTER ICC also will provide the EOC with status information which includes the “as-flown” ASTER instrument operations timeline.

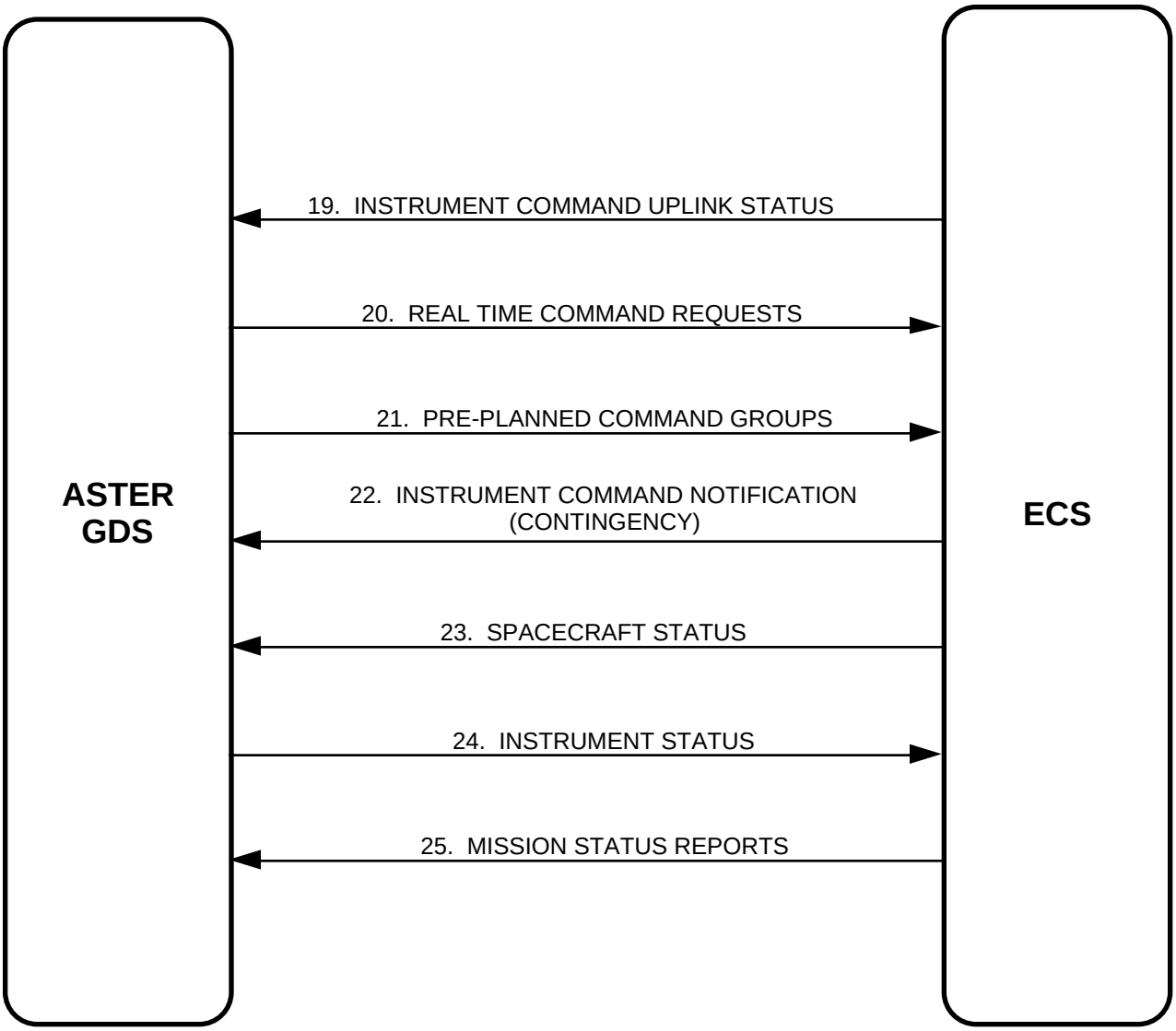

Figure 4-5. Instrument Operations Data Flows

Periodically, the EOC and ASTER ICC may exchange updated Spacecraft and Instrument Status information. These reports may incorporate information obtained during off-line analysis, such as spacecraft or instrument status and trending information, success or failure of spacecraft maneuvers, spacecraft clock drift measurements, etc. The EOC also will provide the ASTER ICC with periodic AM-1 Mission Status Reports [Table 4-1, Data Flow 25]. These reports may contain such information as overall spacecraft and mission status, scheduled versus actual target observations, etc.

4.6 Science Data Handling

Data flows associated with ASTER science data handling are shown in Figure 4-6. All ASTER science data will be downlinked from the AM-1 spacecraft and forwarded to EDOS for Level 0 processing. EDOS will construct the ASTER Level 0 Production Data Set (PDS) from the raw science data stream, and make the data set available for postal pickup within 21 hours of receipt of the last packet at EDOS. EDOS also will provide a complete set of spacecraft and instrument housekeeping data a Level 0 PDS. The contents of the ASTER Level 0 PDSs will be negotiated between the ASTER instrument team and EDOS.

The ASTER SDPS will process all of the ASTER Level 0 data to Level 1a. All Level 1a products, metadata, and browse files will be available for postal pickup at the ASTER SDPS within an average of 24 hours following the receipt and ingest of corresponding Level 0 data at the ASTER SDPS [Table 4-1, Data Flow 27]. The ASTER SDPS will generate standard EOS ASTER data products: Level 1a, Level 1b, and Level 2 and higher (if any). The quantity of Level 1b data generated by the ASTER GDS is limited to 310 scenes per day. These 310 scenes per day of Level 1b data will be delivered to ECS at the same time as the corresponding Level 1a data (i.e., available for postal pickup within an average of 24 hours following the receipt and ingest of the corresponding Level 0 data at the ASTER SDPS). Requests for data products in excess of the 310 scene limit will be honored on an as-time-permits basis. Priorities for effective use of the ASTER SDPS processing capacity will be set in consultation with the ASTER Science Team. The ASTER SDPS will provide the ECS SDPS with a Data Shipping Notice [Table 4-1, Data Flow 29] which will specify the expected delivery schedule for ASTER GDS products.

In the event of an on-board AM-1 spacecraft anomaly, it is possible that the GSFC FDF may be required to repair the spacecraft orbit data that will normally be supplied in the telemetry ancillary data packets.

4.7 User Search and Request Interface

The ASTER GDS and ECS will support two-way Level 3 interoperability. These data flows are shown in Figure 4-7. This will allow EOSDIS users and ASTER GDS users to have access to data products archived at ECS and ASTER GDS, respectively. ECS and ASTER GDS will exchange Dependent Valids [Table 4-1, Data Flows 35 and 36] which will be used to identify

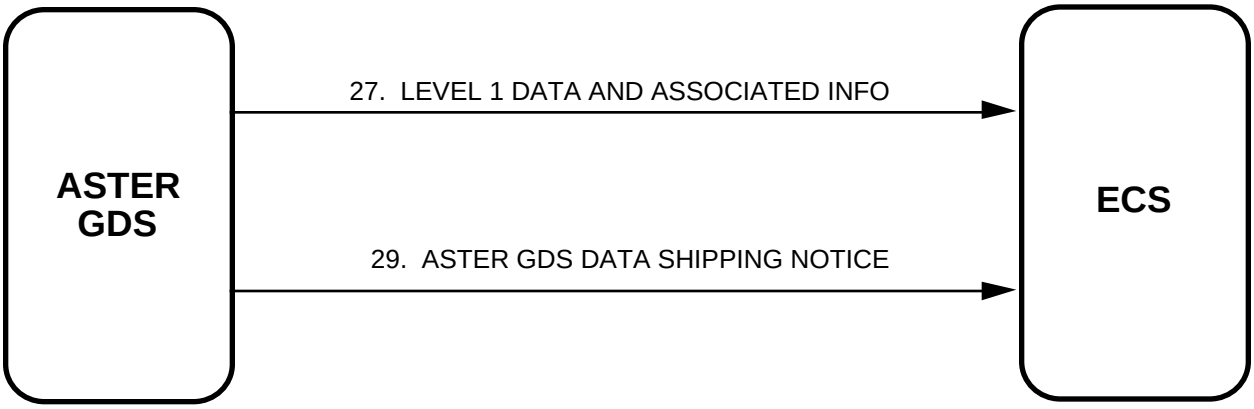

Figure 4-6. Science Data Handling Data Flows

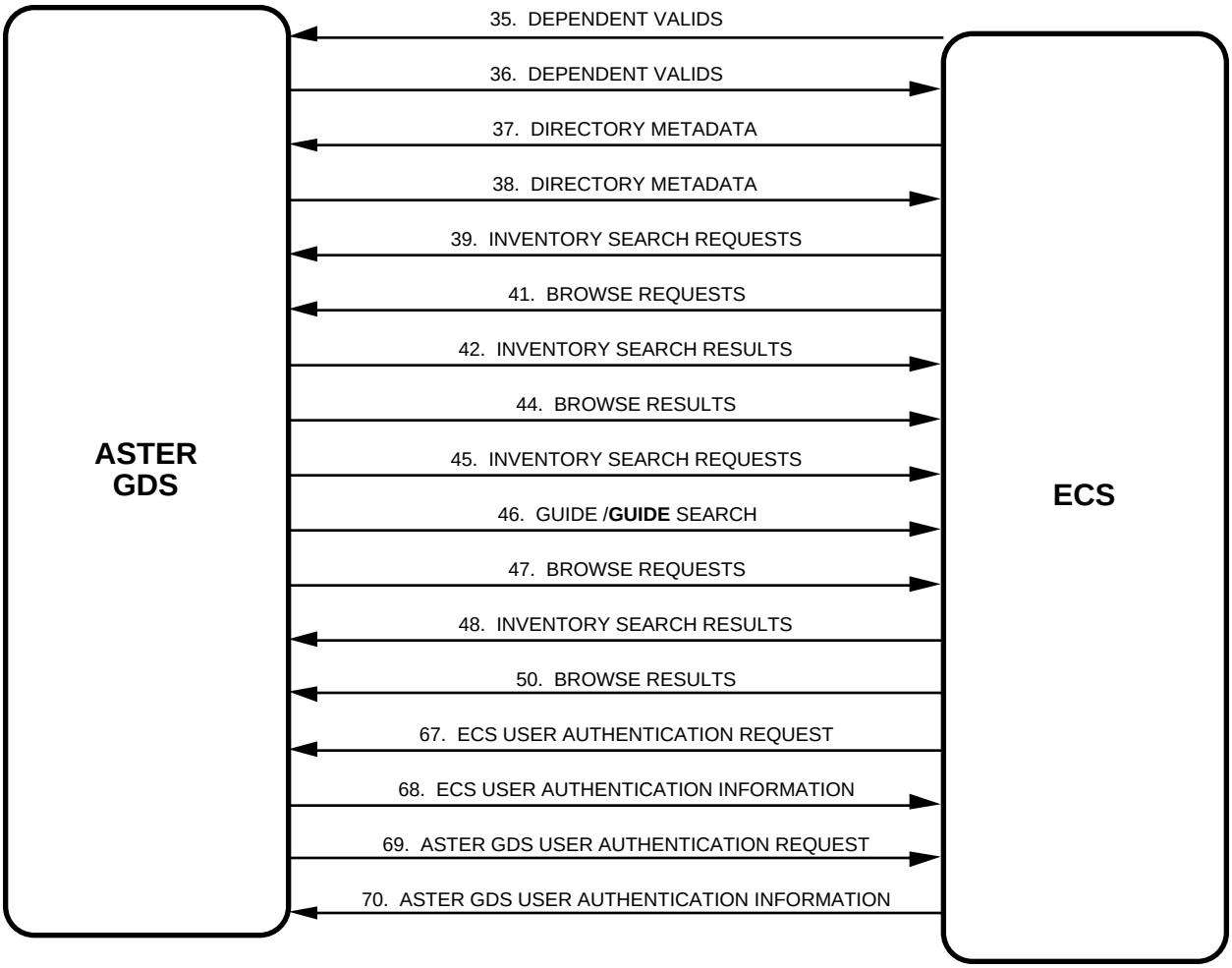

Figure 4-7. User Search and Request Data Flows

information about data products, including valid lists for variables. ECS and ASTER GDS information servers will support Level 3 interoperability through the exchange of standard search protocols. Both ECS and ASTER GDS will have the capability to exchange Directory Metadata [Table 4-1, Data Flows 37 and 38] in order to maintain or provide access to directory entries for ECS and ASTER GDS data sets. Users may search the Directory Metadata and submit queries against available inventory, guide, and browse data.

If an EOSDIS user wishes to search the ASTER GDS system, the ECS will provide an ECS User Authentication Request [Table 4-1, Data Flow 67] to the ASTER GDS. The ASTER GDS will respond with ECS User Authentication Information [Table 4-1, Data Flow 68] providing the access privileges granted. EOSDIS users will be able to submit queries (Inventory Search Requests, Browse Requests) [Table 4-1, Data Flows 39, and 41] for ASTER GDS products to the ECS SDPS. The ECS SDPS will pass the user query to the ASTER GDS SDPS, which will respond with the search results (Inventory Search Results, Browse Results) [Table 4-1, Data Flows 42, and 44]. The ECS SDPS presents the search results to the EOSDIS user.

Similarly, if an ASTER GDS user wishes to search the ECS system, the ASTER GDS will provide an ASTER GDS User Authentication Request [Table 4-1, Data Flow 69] to ECS. ECS will respond with ASTER GDS User Authentication Information [Table 4-1, Data Flow 70] providing the access privileges granted. ASTER GDS users also will be able to submit queries (Inventory Search Requests, Browse Requests) [Table 4-1, Data Flows 45, 46, and 47] for ECS products to the ASTER GDS SDPS. The ASTER GDS SDPS will pass the user query to the ECS SDPS, which will respond with the search results (Inventory Search Results, Browse Results) [Table 4-1, Data Flows 48, and 50]. The ASTER GDS SDPS presents the search results to the ASTER GDS user. The interface [46] for Guide is unidirectional from ASTER GDS to ECS. GDS Guide for ASTER will be delivered by the ASTER GDS to the ECS on 4mm Tape Media. ECS will ingest the GDS Guide and make the documents available as part of the ECS Guide holdings. GDS users will have access to ECS Guide and ECS Guide search capabilities via the internet and HTTP. ECS users will also utilize the ECS Guide for access to the ASTER GDS documents ingested into the ECS.

4.8 Product Request and Delivery

Data flows associated with product request and delivery are shown in Figure 4-8. An EOSDIS user may submit a Product Request for an ASTER GDS product to the ECS SDPS. The ECS SDPS will pass the Product Request [Table 4-1, Data Flow 51] to the ASTER GDS. The Product Request may include a request for product generation. The ASTER SDPS will respond with Product Delivery Status information [Table 4-1, Data Flow 53], which the ECS SDPS forwards to the user. The EOSDIS user also may query the status of a Product Request which was previously submitted to ASTER GDS. The ECS SDPS will pass the Product Delivery Status Request [Table 4-1, Data Flow 54] to the ASTER GDS SDPS. The ASTER GDS SDPS, again, responds with Product Delivery Status information, which will be forwarded to the user by the ECS SDPS.

Likewise, an ASTER GDS user also may submit a Product Request for an ECS product to the ASTER GDS SDPS. The ASTER GDS SDPS will pass the Product Request [Table 4-1, Data Flow 55] to the ECS. The Product Request may include a request for product generation. The ECS SDPS will respond with Product Delivery Status information [Table 4-1, Data Flow 57], which the ASTER GDS SDPS forwards to the user. The ASTER GDS user also may query the status of a Product Request which was previously submitted to ECS. The ASTER GDS SDPS will pass the Product Delivery Status Request [Table 4-1, Data Flow 58] to the ECS SDPS. The ECS SDPS, again, responds with Product Delivery Status information, which will be forwarded to the user by the ASTER GDS SDPS.

ECS and ASTER SDPS also may submit Product Requests to each other for data sets (e.g., ASTER GDS Data Products [Table 4-1, Data Flow 59]; Level) Expedited Level 0 and ECS Data Products [Table 4-1, Data Flow 60]) to support generation and/or validation of ASTER or other EOSDIS data products. As with the user requests, Product Delivery Status Requests and Product Delivery Status information also may be exchanged ASTER GDS will provide Data Shipping Notice [Table 4-1, Data Flow 29] to identify the expected delivery schedule for these products.

Both ECS and ASTER GDS will deliver their data products directly to the user (requester) of the data. The receiver of the data will be responsible for data delivery expenses, such as the cost associated with media and shipping.

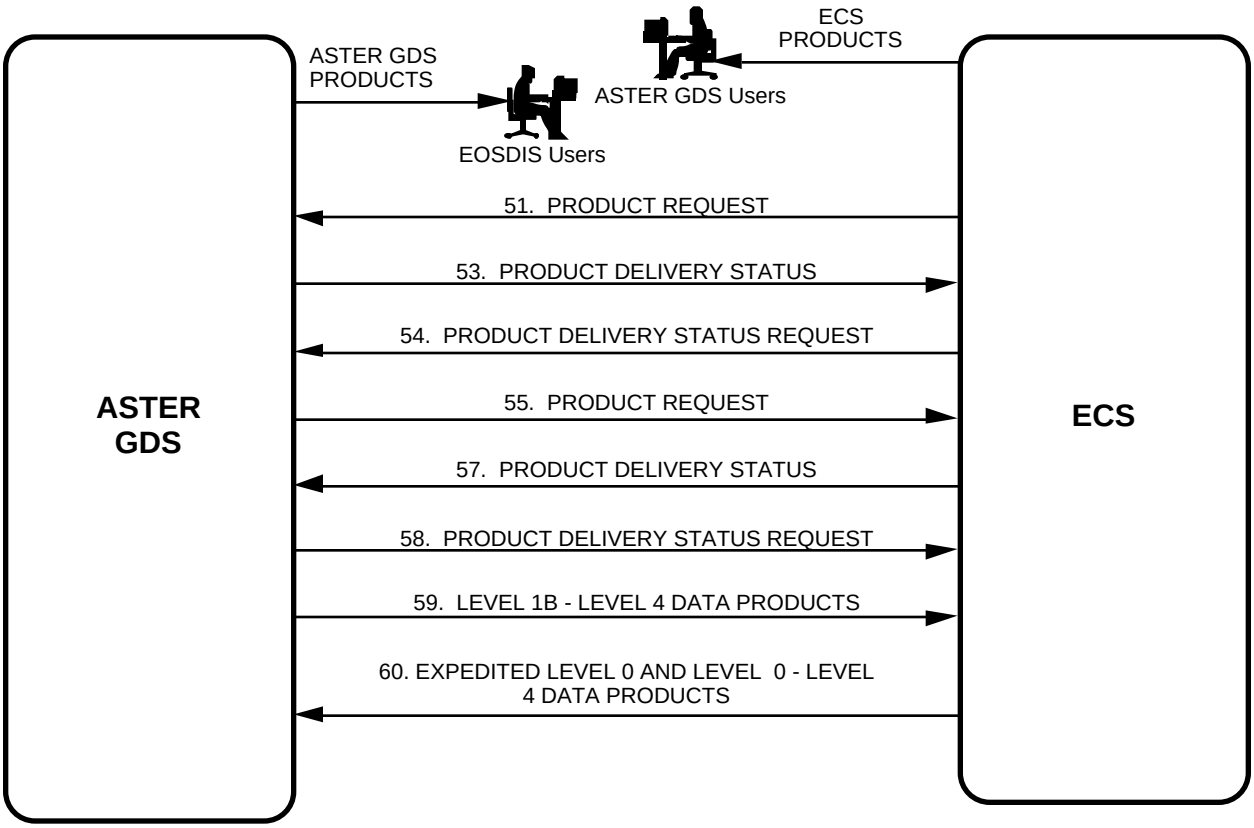

Figure 4-8. Product Request and Delivery Data Flows

4.9 System and Network Management

The ECS CSMS and ASTER GDS CSMS will interface to exchange network management information [Table 4-1, Data Flow 63] associated with communications between the ASTER GDS and the ECS. In particular, this involves status, schedule, and fault isolation coordination associated with Japanese networks. The interface for ECS/ASTER GDS network management is shown in Figure 4-9. Network management information may be supplied when status changes, or upon request [Table 4-1, Data Flow 66]. ECS and ASTER GDS also will exchange system management information, as necessary, to inform each other of system activities (such as special tests, maintenance, or system faults) that may affect ECS/ASTER GDS interfaces [Table 4-1, Data Flows 74 and 75].

Status, schedule and fault isolation information related to mission critical flight operations communications involving spacecraft or instrument operations will be coordinated among the EOC, ASTER ICC, and other EOSDIS components (e.g., EDOS), as appropriate.

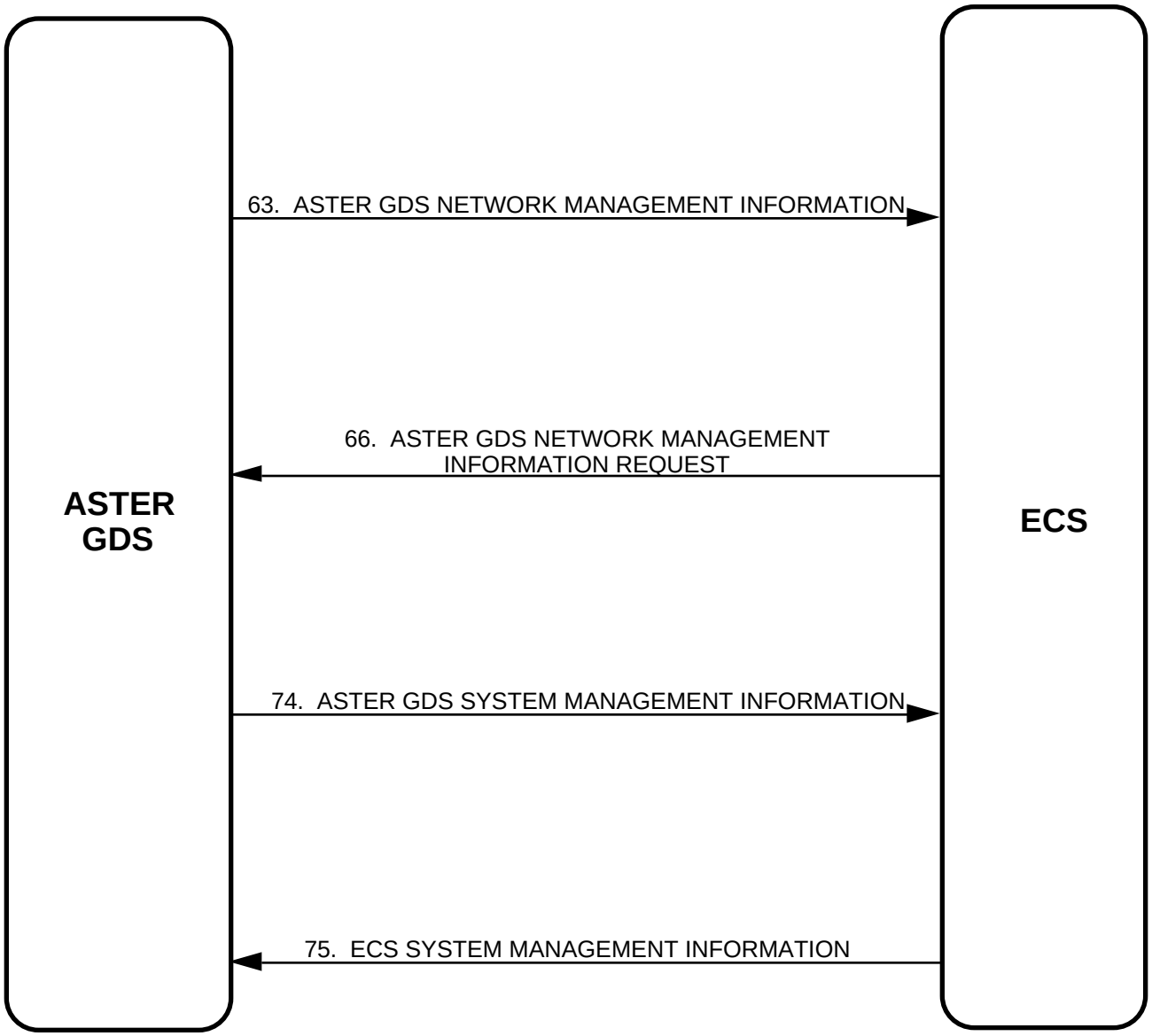

Figure 4-9. Network Management Data Flows

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5. Functional and Performance Interface Requirements

5.1 Requirements Traceability

The functional and performance interface requirements identified in this document will be traced to the following parent documents:

a. Functional and Performance Requirements Specification for the EOSDIS Core System

b. Earth Science Data and Information System (ESDIS) Project -- Level 2 Requirements

c. Project Implementation Plan, Volume II - Ground Data System, Advanced Spaceborne Thermal Emission and Reflection Radiometer and ESDIS and EOS-AM Projects

d. Memorandum of Understanding Between the United States National Aeronautics And Space Administration and the Ministry of International Trade and Industry of Japan concerning Cooperation in the Flight of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) on the NASA Polar Orbiting Platform and Related Support for an International Earth Observing System

5.2 Pre-Mission Functional Interface Requirements

5.2.1 Science Software Delivery Interface Requirements

ASTER-0010 ECS and ASTER GDS shall conform to the IRD Between EOSDIS Core System and Science Computing Facilities with regard to the passing of data production software and calibration coefficients between the two systems in support of data production software development for standard ASTER data products.

ASTER-0020 ASTER GDS shall have the capability to send and ECS (EDC DAAC) shall have the capability to receive all algorithms, source code, and documentation used by the ASTER GDS to process ASTER Level 0 data to Level 1 and higher level standard products.

ASTER-0030 ECS (EDC DAAC) shall have the capability to send and ASTER GDS shall have the capability to receive all algorithms, source code, and documentation used by ECS to process ASTER Level 1 data to higher level standard products.

5.2.2 Long Term Planning Interface Requirements

ASTER-0040 ECS shall have the capability to send and ASTER GDS shall have the capability to receive EOS Long Term Science Plans.

ASTER-0045 ECS shall have the capability to send and ASTER GDS shall have the capability to receive EOS Long Term Instrument Plans.

5.2.3 Operations Data Base Interface Requirements

ASTER-0050 ASTER GDS shall have the capability to send and ECS shall have the capability to receive requests for updates to the ASTER operations data base.

ASTER-0060 ECS shall have the capability to send and ASTER GDS shall have the capability to receive an updated EOC operations data base, containing at a minimum, spacecraft and instrument telemetry formats, limits, and associated information and ASTER instrument command formats and associated information.

5.2.4 DAR Development Data Base Interface Requirements

ASTER-0100 ASTER GDS shall have the capability to send and ECS shall have the capability to receive information on ASTER instrument operations and constraints that may be applicable to DAR specification. The ASTER instrument constraint information shall include (at a minimum):

a. descriptive information for the ASTER instrument

b. default settings for instrument configurable parameters

c. range of values for instrument configurable parameters

d. instrument constraint information

5.3 DAR Handling Functional Interface Requirements

ASTER-0110 ECS shall have the capability to send and ASTER GDS shall have the capability to receive DARs for the ASTER instrument. DARs shall contain the following information, at a minimum:

a. Observation number

b. Experimenter identification

c. Experimenter address

d. Investigation identification

e. Scientific discipline

f. Observation repetition period

g. Tolerance in observation time

h. User priority

i. Scheduling priority and target of opportunity flag

j. Descriptive text

k. Location data expressed in terms of longitude and latitude as earliest start coordinates and latest stop coordinates

l. Earliest start time

m. Latest stop time

n. Minimum coverage required

o. Maximum coverage desired

p. Deleted

q. Deleted

r. Associated product generation request and product distribution request.

s. Pointing angle

t. Calibration requirements

u. Coordination requirements

v. Data transmission requirements

w. Illumination requirements (day/night)

x. Specific time of observation

y. Sun angle

z. Direct downlink option

ASTER-0120 ASTER GDS shall have the capability to send and ECS shall have the capability to receive DAR status, when requested by ECS. [Issue 9] DAR status shall include such information as confirmation or rejection of the DAR, and notification of DAR scheduling and completion, to include at a minimum:

a. Date and time

b. Instrument ID

c. DAR ID

d. Request status

e. Implementation schedule

f. If rejection, then the reason for the rejection.

ASTER-0130 ECS shall have the capability to send and ASTER GDS shall have the capability to receive queries for the current status of ASTER DARs which were previously submitted to the ASTER GDS by ECS.

ASTER-0140 ECS shall have the capability to send and the ASTER GDS shall have the capability to receive changes to DARs for the ASTER intrument.

5.4 Planning & Scheduling/Command Load Functional Interface Requirements

ASTER-0200 ECS shall have the capability to send and ASTER GDS shall have the capability to receive planning aids (e.g., predicted orbit data, and spacecraft maneuver information).

ASTER-0210 ASTER GDS shall have the capability to send and ECS shall have the capability to receive ASTER instrument resource profiles and instrument resource deviation lists (when a resource profile exists)[2].

ASTER-0220 ECS shall have the capability to send and ASTER GDS shall have the capability to receive a notification when ASTER instrument resource profile information cannot be integrated into the preliminary resource schedule.

ASTER-0230 ECS shall have the capability to send and ASTER GDS shall have the capability to receive a preliminary resource schedule. The preliminary resource schedule shall include, at a minimum, the following:

a. Activity and DAR identifiers

b. Resource availability and usage requirements

c. Time constraints

d. TDRSS schedule

ASTER-0240 ASTER GDS shall have the capability to send and ECS shall have the capability to receive instrument activity lists and instrument activity deviation lists (when an activity list exists) and any updates thereto.[3]

ASTER-0250 ECS shall have the capability to send and ASTER GDS shall have the capability to receive a notification when the ASTER instrument activities cannot be integrated into the detailed activity schedule.

ASTER-0260 ECS shall have the capability to send and ASTER GDS shall have the capability to receive detailed activity schedules and any updates. The detailed activity schedule shall include, at a minimum, the following:

a. Instrument activities

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[2] ASTER One-Day Schedules (ODS) shall be delivered to the EOC in "Instrument Activity List" or "Intrument Activity Deviation List" format.

[3] ASTER One-Day Schedules (ODS) shall be delivered to the EOC in "Instrument Activity List" or "Instrument Acitivity Deviation List" format.

b. Spacecraft activities necessary to support all instrument activities

c. All spacecraft activities necessary for spacecraft subsystem maintenance

d. Spacecraft resource requirements for each activity

e. Traceability of instrument activities to DARs

ASTER-0300 ASTER GDS shall have the capability to send and ECS shall have the capability to receive, both electronically and by voice, information to facilitate, at a minimum, the following:

a. Planning of coordinated operations

b. Resolution of conflicts

c. Exchange of instrument status

ASTER-0310 ECS shall have the capability to send and ASTER GDS shall have the capability to receive, both electronically and by voice, information to facilitate, at a minimum, the following:

a. Planning of coordinated operations

b. Resolution of conflicts

c. Exchange of instrument status

ASTER-0340 ASTER GDS shall have the capability to send and ECS shall have the capability to receive "What-If" planning and scheduling inputs.

ASTER-0350 ECS shall have the capability to send and ASTER GDS shall have the capability to receive "What-If" planning and scheduling results.

ASTER-0410 ECS shall have the capability to send and ASTER GDS shall have the capability to receive command load generation status information, including at a minimum, the following:

a. Spacecraft Control Computer (SCC)-stored command load report

b. Integrated report having orbital events, command execution times, and TDRSS contacts with candidate loads

5.5 Instrument Operations Functional Interface Requirements

ASTER-0520 ASTER GDS shall have the capability to send and ECS shall have the capability to receive real time command requests.

ASTER-0530 ECS shall have the capability to send and ASTER GDS shall have the capability to receive instrument command uplink status. Instrument command uplink status shall include (at a minimum):

a. receipt of the command group at the EOC

b. validation status at the EOC

c. receipt of the command at the AM-1 spacecraft

ASTER-0540 ASTER GDS shall have the capability to send and ECS shall have the capability to receive pre-planned command groups.

ASTER-0550 ECS shall have the capability to send and ASTER GDS shall have the capability to receive instrument command notification when ECS issues emergency/contingency ASTER command groups.

ASTER-0570 ASTER GDS shall have the capability to send and ECS shall have the capability to receive ASTER instrument status data.

ASTER-0580 ECS shall have the capability to send and ASTER GDS shall have the capability to receive AM-1 spacecraft status data.

ASTER-0590 ECS shall have the capability to send and ASTER GDS shall have the capability to receive mission status reports.

5.6 Science Data Handling Functional Interface Requirements

ASTER-0700 ASTER GDS shall have the capability to send and ECS (EDC DAAC) shall have the capability to receive science data products, including Level 1 data, ancillary data, metadata, and browse.

ASTER-0760 ASTER GDS shall have the capability to send and ECS shall have the capability to receive data shipping notice for ASTER GDS data products which were requested by ECS.

5.7 User Search and Request Functional Interface Requirements

ASTER-0800 ECS shall have the capability to send and ASTER GDS shall have the capability to receive dependent valids information related to ECS data products.

ASTER-0805 ASTER GDS shall have the capability to send and ECS shall have the capability to receive dependent valids information related to ASTER GDS data products.

ASTER-0810 ECS shall have the capability to send and ASTER GDS shall have the capability to receive directory metadata related to ECS data products.

ASTER-0815	ASTER GDS shall have the capability to send and ECS shall have the capability to receive directory metadata related to ASTER GDS data products.
ASTER-0820	ECS shall have the capability to send and ASTER GDS shall have the capability to receive inventory search requests.
ASTER-0830	ECS shall have the capability to send and ASTER GDS shall have the capability to receive browse requests.
ASTER-0835	ASTER GDS shall have the capability to send and ECS shall have the capability to receive inventory data search results.
ASTER-0840	ASTER GDS shall have the capability to send and ECS shall have the capability to receive guide information.
ASTER-0845	ASTER GDS shall have the capability to send and ECS shall have the capability to receive browse results.
ASTER-0850	ASTER GDS shall have the capability to send and ECS shall have the capability to receive inventory search requests.
ASTER-0860	ASTER GDS shall have the capability to send and ECS shall have the capability to receive browse requests.
ASTER-0865	ECS shall have the capability to send and ASTER GDS shall have the capability to receive inventory search results.
ASTER-0875	ECS shall have the capability to send and ASTER GDS shall have the capability to receive browse results.
ASTER-0880	ECS shall have the capability to send and ASTER GDS shall have the capability to receive user authentication requests for ASTER GDS privileges of EOSDIS users.
ASTER-0885	ASTER GDS shall have the capability to send and ECS shall have the capability to receive user authentication information specifying ASTER GDS privileges for EOSDIS users.
ASTER-0890	ASTER GDS shall have the capability to send and ECS shall have the capability to receive user authentication requests for ECS privileges of ASTER GDS users.
ASTER-0895	ECS shall have the capability to send and ASTER GDS shall have the capability to receive user authentication information specifying ECS privileges for ASTER GDS users.

5.8 Product Request and Delivery Functional Interface Requirements

ASTER-0900 ECS shall have the capability to send and ASTER GDS shall have the capability to receive product requests for ASTER GDS data products.

ASTER-0910 ASTER GDS shall have the capability to send and ECS shall have the capability to receive product delivery status information. Product delivery status information contains the following information, at a minimum:

a. Requester identification

b. Request identification

c. Request status

d. If rejection, then the reason for the rejection

e. If delayed longer than the latest completion time specified by the user, adjusted start and stop times.

ASTER-0915 ECS shall have the capability to send and ASTER GDS shall have the capability to receive requests for product delivery status.

ASTER-0920 ASTER GDS shall have the capability to send and ECS shall have the capability to receive product requests for ECS data products.

ASTER-0930 ECS shall have the capability to send and ASTER GDS shall have the capability to receive product delivery status information. Product delivery status information contains the following information, at a minimum:

a. Requester identification

b. Request identification

c. Request status

d. If rejection, then the reason for the rejection

e. If delayed longer than the latest completion time specified by the user, adjusted start and stop times.

ASTER-0935 ASTER GDS shall have the capability to send and ECS shall have the capability to receive requests for product delivery status.

ASTER-0940 ECS shall have the capability to send and ASTER GDS shall have the capability to receive Expedited Level 0 and ECS data products, in response to a request from the ASTER GDS.

ASTER-0945 ASTER GDS shall have the capability to send and ECS shall have the capability to receive ASTER data products, in response to a request from ECS.

5.9 System and Network Management Functional Interface Requirements

ASTER-1000 ECS shall have the capability to send and ASTER GDS shall have the capability to receive ECS system and network management information.

ASTER-1005 ECS shall have the capability to send and ASTER GDS shall have the capability to receive requests for ASTER GDS network management information.

ASTER-1010 ASTER GDS shall have the capability to send and ECS shall have the capability to receive ASTER GDS system and network management information.

ASTER-1015 ASTER GDS shall have the capability to send and ECS shall have the capability to receive requests for ECS system management information.

ASTER-1030 ASTER GDS shall provide the necessary communications connections to the trans-Pacific link.

ASTER-1045 ASTER GDS shall provide any necessary protocol translation, termination, bridging, and routing for ASTER GDS communications interfaces to the trans-Pacific link for ECS communications.

ASTER-1060 ECS shall provide support for Transmission Control Protocol/Internet Protocol (TCP/IP) communications protocols to the U.S. Gateway for ASTER GDS communications.

ASTER-1065 ASTER GDS shall provide support for Transmission Control Protocol/Internet Protocol (TCP/IP) communications protocols to the trans-Pacific link for ECS communications.

ASTER-1080 The interface between ECS and ASTER GDS shall be compliant with interface guidelines identified in the ECS Security Plan.

5.10 Performance Interface Requirements

(Note: These performance requirements have been included for completeness and as an aid in understanding the performance requirements associated with the complete end-to-end system. NASA assumes that the ASTER GDS will have performance requirements that are similar to the performance requirements of the ECS.)

ASTER-2000 ECS functions shall have an operational availability (computed as defined in the Functional and Performance Requirements Specification for the EOSDIS Core System) of 0.96 at a minimum and a Mean Down Time (MDT) of four (4) hours or less, unless otherwise specified.

ASTER-2030 The ECS FOS shall have an operational availability of 0.99925 at a minimum and a MDT of five (5) minutes or less for real time functions that support:

a. Launch

b. Early orbit checkout

c. Disposal

d. Orbit adjustment

e. Anomaly investigation

f. Recovery from safe mode

g. Routine real time commanding and associated monitoring for spacecraft and instrument health and safety.

ASTER-2040 The ECS FOS shall have an operational availability of 0.992 at a minimum and a MDT of (1) hour or less for functions associated with Targets of Opportunity (TOOs).

ASTER-2060 The ECS SDPS function of receiving science data shall have an operational availability of 0.999 at a minimum and an MDT of two (2) hours or less.

ASTER-2080 The ECS function for gathering and disseminating management information shall have an operational availability of .998 at a minimum and an MDT of 20 minutes or less, for critical services.

ASTER-4000 ASTER GDS shall have an operational availability of 0.96 at a minimum and a Mean Down Time (MDT) of four (4) hours or less, unless otherwise specified.

ASTER-4030 ASTER GDS shall have an operational availability of 0.99925 at a minimum and a MDT of five (5) minutes or less for real time functions.

ASTER-4040 The ASTER GDS shall have an operational availability of 0.992 at a minimum and a MDT of (1) hour or less for functions associated with Targets of Opportunity (TOOs).

ASTER-4060 The ASTER GDS function of receiving science data shall have an operational availability of 0.999 at a minimum and an MDT of two (2) hours or less.

ASTER-4080 The ASTER GDS function for gathering and disseminating management information shall have an operational availability of .998 at a minimum and an MDT of 20 minutes or less, for critical services.

5.11 Data Volume Estimates

ASTER-5000 The estimated volume of ASTER Level 1a data sent from the ASTER GDS to ECS is 131.472 GB/day.

ASTER-5010 The estimated volume of ASTER Level 1b data sent from the ASTER GDS to ECS is the data volume that results when at least 40% of the ASTER Level 1a data is processed to Level 1b.

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6. Interface Control Documentation Plan

The ICD planned which corresponds to this IRD is entitled Interface Control Document Between EOSDIS Core System and ASTER GDS. This ICD will define the functional and physical design of each interface between ECS and the ASTER GDS, and will include the precise data contents and format of each interface. All modes (options) of data exchange for each interface will be described as well as the conditions required for each mode or option. Additionally, data rates, duty cycles, error conditions, and error handling procedures will be included. The sequence of exchanges will be completely described (e.g., required handshaking.) Communications protocols or physical media will be detailed for each interface. The ICD Between ECS and ASTER GDS will be controlled by ESDIS and ASTER GDS Configuration Control. Development of this ICD is the responsibility of the ECS contractor.

The ECS/ASTER GDS interfaces are currently scheduled for implementation in ECS Release A (partial implementation) and B (full implementation). The delivery plan for the ICD Between ECS and ASTER GDS is as follows:

- ECS delivered a preliminary ICD one month prior to the ECS Release A Preliminary Design Review (PDR). This ICD contained preliminary definitions for the ECS/ASTER GDS interfaces that will be implemented in ECS Release A.
- ECS will deliver an updated ICD two weeks prior to the ECS FOS Critical Design Review (CDR) in October 1995. This ICD will contain final definitions of the ECS/ASTER GDS interfaces that involve the ECS FOS. This version of the ICD also will contain preliminary definitions of the ECS/ASTER GDS interfaces that involve the ECS SDPS and the ECS CSMS. The ICD will clearly define which interface definitions are final and which interface definitions are preliminary. At this time, the ICD will be placed under configuration control by the applicable CCBs.
- ECS will deliver an update to the ICD two weeks prior to the ECS CDR for SDPS/CSMS. This ICD will contain final definitions for all ECS/ASTER GDS interfaces. This ICD also will be placed under configuration control by the applicable CCBs.

It is expected that the ECS and ASTER GDS contractors will work together closely in the development of this ICD. The ICD plan presented in this document details only the formal deliveries; it is expected that additional informal reviews and information exchanges will occur, as necessary, during the ICD development process.

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Appendix A. Issues

1. Responsibility for the trans-Pacific link between the U.S. and Japan needs to be established.

   Issue Deleted: Responsibility for the trans-Pacific link will be negotiated between the NASA network implementation organization and ERSDAC . This is not an issue for the ECS/ASTER GDS IRD.

2. Ownership of the "U.S. Gateway" or router(s) at JPL and Ames Research Center that will carry ESN traffic to Japan needs to be established. Who will ECS deal with if these routers fail?

   Issue Resolved: Ownership of the U.S. Gateway is not an issue. Each U.S. network provider will use its own router to connect to the PSCN switch, just as with other sites.

3. This IRD assumes that product delivery will always be via postal delivery. The capability for delivering low volume data products (for instance, ancillary data, correlative data, or history data) electronically should be investigated.

   Issue Resolved: ERSDAC has not identified any special requirements for electronic delivery of ancillary or correlative data. The requirement for history data has been deleted. Product delivery is assumed to be via media transfer.

4. Do these data exchanges (between the ASTER ICC and the EOC) require the Ecom level-of-service?

   Issue Resolved: It is agreed that these data exchanges between the ASTER ICC and the EOC require the Ecom level-of-service since these data exchanges are required for mission critical operations.

5. There are several trade studies on-going in reference to the Level 1 architecture for processing ASTER Level 1 data. This IRD reflects the project baseline (Level 1a processing in Japan; all Level 1a data routinely provided to ECS on tape; Level 1b data available to ECS on request). Some of the in-progress trade studies address Level 1 processing capabilities in the U.S., and the handling of Ground Control Points (GCPs) and user-specified map projections.

   Issue Resolved: ERSDAC has not identified any new IRD requirements related to the Level 1 architecture. ECS is proceeding according to the current IRD requirements.

6. Action items have been assigned to ECS and ERSDAC to identify the specific SCF functions that apply to the ASTER GDS/ECS interface.

   Issue Resolved: The SCF data flows that are relevant to the ASTER GDS-ECS interface are those data flows associated with data production software delivery and calibration coefficient updates. This clarification is reflected in this version of the IRD.

7. The ASTER ICC capability for transmitting real time command groups to the EOC is under study by ERSDAC. It is not essential for the ASTER GDS to implement a real time command capability since the ASTER operations concept is to normally operate the instrument via stored commands, and the EOC has the capability to perform real time commanding during anomaly situations. ERSDAC will notify ESDIS as soon as a decision is made with regard to implementing this capability in the ASTER GDS.

   Issue Resolved: It is agreed that this IRD will not include requirements for the EOC to receive real time command groups from the ASTER ICC. The ASTER ICC may, however, send real time command requests to the EOC to request the FOT to uplink a real time command to the ASTER instrument. This is reflected in this version of the IRD.

8. The ASTER GDS currently does not have requirements to provide ASTER history log data to the ECS SDPS. ASTER GDS plans to permanently archive ASTER history data at the ASTER DADS for TBD years. How this data will get to ECS, or if this information is really required at ECS needs to be investigated.

   Issue Resolved: It is agreed that the ASTER GDS is not required to provide instrument history files to ECS for permanent archive. It is noted that the EOC archives a complete command and housekeeping telemetry history at the GSFC DAAC .

9. The ASTER GDS currently does not have requirements to provide ECS with updated DAR status, when the status changes. ERSDAC's current concept is for ASTER GDS to provide DAR status to ECS only in response to an ECS DAR Status Request.

   Issue Resolved: It is agreed that ASTER GDS will provide DAR status to ECS only in response to an ECS DAR Status Request.

10. The current concept of the EOC using ASTER Activity List mnemonics to generate ASTER stored commands needs to be tracked and validated by ECS and ERSDAC. Also, it is possible that the ASTER instrument may have a command sequence which cannot be expressed in mnemonic format.

    Issue Resolved: All ASTER instrument command sequences will be assigned mnemonics in the EOC data base.

11. Quick look data and Quick look products have been proposed for deletion.

    Issue Resolved: Quick look data and quick look products have been deleted from this IRD. It is assumed that ECS will not receive Quick Look Level 1 products based on Expedited Data Sets (EDS) that the ASTER GDS may receive from EDOS.

Abbreviations and Acronyms

ADN	ASTER Data Network
AOS	ASTER Operations Segment
ASF	Alaska SAR Facility
AST	ASTER Science Team
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
ATC	absolute time command
CCB	Configuration Control Board
CCR	Configuration Change Request
CDR	Critical Design Review
CDRL	Contract Data Requirement List
CLCW	Command Link Control Word
CSMS	Communications and System Management Segment
DAAC	Distributed Active Archive Center
DADS	Data Archive and Distribution System
DAR	Data Acquisition Request
DCN	Document Change Notice
DDL	Direct Downlink
DID	Data Item Description
DIF	Data Interface Facility (EDOS)
DPF	Data Production Facility (EDOS)
DRS	DDL Receiving Station
ECS	EOSDIS Core System
EDC	EROS Data Center
EDOS	EOS Data Operations System
EDS	Expedited Data Set
EGS	EOS Ground System

EOC	Earth Operations Center
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
EROS	Earth Resources Observation System
ERSDAC	Earth Remote Sensing Data Analysis Center
ESDIS	Earth Science Data and Information System
F&PRS	Functional and Performance Requirements Specification
FDF	Flight Dynamics Facility
FOS	Flight Operations Segment
FOT	Flight Operations Team
GCP	ground control point
GDS	Ground Data System
GFP	Government Furnished Property
GOSIP	Government Open System Interconnection Profile
GSFC	Goddard Space Flight Center
GSMS	Ground System Management Subsystem
HAIS	Hughes Applied Information Systems
I&T	Integration and Test
ICC	Instrument Control Center
ICD	Interface Control Document
ICWG	Interface Control Working Group
IDB	Instrument Data Base
IDR	Incremental Design review
IMS	Information Management System
IP	International Partners
IRD	Interface Requirement Document
ISO	International Standards Organization
IST	Instrument Support Terminal
IWG	Investigator Working Group

JAROS	Japan Resources Observation System
JPL	Jet Propulsion Laboratory
LAN	Local Area Network
LaRC	Langley Research Center
LSM	Local System Management
LTIP	Long Term Instrument Plan
LTSP	Long Term Science Plan
MDT	mean down time
MITI	Ministry of International Trade and Industry (Japan)
MO&DSD	Mission Operations and Data Systems Directorate (GSFC Code 500)
MOM	Mission Operations Manager
MOU	Memorandum of Understanding
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
Nascom	NASA Communications
NASDA	National Space Development Agency (Japan)
NOLAN	Nascom Operational Local Area Network
NSI	NASA Science Internet
NSIDC	National Snow and Ice Data Center
ODS	One-Day Schedule (ASTER)
ORNL	Oak Ridge National Laboratory
OSI	Open Systems Interconnection
PDB	Project Data Base
PDR	Preliminary Design Review
PDS	Production Data Set
PGS	Product Generation System
PI	Principal Investigator
PIA	Project Implementation Agreement
PSAT	Predicted Site Acquisition Table

PSCN	Program Support Communications Network
QA	Quality Assurance
SAR	Synthetic Aperture Radar
SCF	Science Computing Facility
SDPS	Science Data Processing Segment
SDR	System Design Review
SMC	System Monitoring and Control
SRR	System Requirements Review
STS	Short Term Schedule (ASTER)
SWIR	Short-wave Infrared
TBD	to be determined
TBR	To Be Resolved, To Be Reviewed
TBS	to be supplied
TCP/IP	Transmission Control Protocol/Internet Protocol
TDRSS	Tracking and Data Relay Satellite System
TIR	Thermal Infrared
TL	Team Leader
TOO	Target of Opportunity
TSS	TDRSS Service Session
UAV	User Antenna View
U.S.	United States
VNIR	Visible and Near Infrared
WAN	Wide Area Network